AMERICAN ANNALS

OF

The Deaf

ORGAN OF THE CONVENTION OF AMERICAN INSTRUCTORS OF THE DEAF

EDITED BY

IRVING S. FUSFELD

UNDER THE DIRECTION OF

PERCIVAL HALL, OF THE DISTRICT OF COLUMBIA; FRANK M. DRIGGS, OF UTAH; H. M. McMANAWAY, OF VIRGINIA; THOMAS S. McALONEY, OF COLORADO; W. LAURENS WALKER, OF SOUTH CAROLINA, AND E. McK. GOODWIN, OF NORTH CAROLINA

COMMITTEE OF THE CONFERENCE OF SUPERINTENDENTS AND PRINCIPALS OF AMERICAN SCHOOLS FOR THE DEAF

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CONFERENCE ON THE PROBLEMS OF THE DEAF

Friday, January 20, and Saturday, January 21, 1928, a most extraordinary gathering of men and women in conference upon the problems of the deaf was convened at the building of the National Academy of Sciences, Washington, D. C., at the call and under the auspices of the National Research Council. The individuals invited to this conference, each an outstanding figure in one or more of the many divisions of the major problem of deafness, took up for consideration—mainly with a view to coordination—a program of aims and needs.

The participating members included:

Dr. Knight Dunlap, chairman of the Division of Anthropology and Psychology, National Research Council, *chairman;*
Miss Mabel E. Adams, principal, Horace Mann School for the Deaf, Boston.
Dr. Madison Bentley, professor of psychology, University of Illinois;
Dr. Gordon Berry, past president, American Federation of Organizations for the Hard of Hearing, Worcester, Mass.;
Dr. Fay-Cooper Cole, vice-chairman, Division of Anthropology and Psychology, National Research Council;
Mr. Frank M. Driggs, superintendent, Utah School for the Deaf and the Blind;
Dr. Harvey Fletcher, Bell Telephone Laboratories, New York City;
Mr. T. C. Forrester, superintendent, Rochester School for the Deaf, Rochester, N. Y.;
Dr. Robert H. Gault, Vibro-Tactile Laboratory, Northampton, Mass;
Dr. S. R. Guild, director, Otological Laboratory, Johns Hopkins Hospital;
Dr. Max A. Goldstein, Central Institute for the Deaf, St. Louis, Mo.;
Mr. Elbert A. Gruver, superintendent, Pennsylvania Institution for the Deaf;
Dr. Percival Hall, president, Gallaudet College, Washington, D. C.;
Mr. Neil M. Judd, member of the executive committee, Division of Anthropology and Psychology, National Research Council;
Dr. H. T. Karsner, chairman, Division of Medical Sciences, National Research Council;
Miss Bessie N. Leonard, principal, Clarke School for the Deaf, Northampton, Mass.;
Mr. H. M. McManaway, superintendent, Virginia School for the Deaf and Blind, Staunton, Va.;
Dr. Horace Newhart, president, American Federation of Organizations for the Hard of Hearing, Minneapolis, Minn.;
Dr. Donald G. Paterson, professor of psychology, University of Minnesota;

Dr. F. H. Pike, physiologist, Columbia University, New York City;
Dr. R. Pintner, professor of educational psychology, Teachers College, Columbia University;
Dr. C. W. Richardson, chairman, Committee on Physical Causes of Deafness, National Research Council;
Dr. G. E. Shambaugh, professor of otology and laryngology, Rush Medical College, Chicago, Ill.;
Dr. G. L. Streeter, director, department of embryology, Carnegie Institution of Washington, Baltimore, Md.;
Dr. Harris Taylor, president, American Association to Promote the Teaching of Speech to the Deaf;
Miss Josephine B. Timberlake, superintendent, Volta Bureau;
Dr. J. Gordon Wilson, professor of oto-laryngology, Northwestern University Medical School, Chicago, Ill.;
Miss B. C. Wright, secretary, American Federation of Organizations for the Hard of Hearing.

The first meeting was held Friday, January 20, in the Board Room, at 10 A. M.

Dr. Vernon Kellogg, chairman of the Division of Educational Relations of the National Research Council, officially welcoming the members of the conference, called attention to the interest in the problems of deafness previously shown by the National Research Council in furthering a series of special studies; first an extensive survey of schools for the deaf, secondly an intensive investigation into the physical causes of deafness, and thirdly experiments in tactile interpretation of spoken speech. The present conference, he felt, was another indication of this interest in the scientific problems raised by the occurrence of deafness.

The proceedings were opened by the appointment by the chair of a committee on resolutions and recommendations, consisting of Mr. McManaway, Mr. Gruver and Dr. Fletcher.

Dr. Gault read a paper on the application of the vibrational method to the instruction of the deaf. This paper, which appears in another part of this issue of the ANNALS, is a resumé of the results of experiments conducted by Dr. Gault with deaf children during the past four years to determine the possibilities in understanding spoken speech by the sense of touch. The vibrational method, as an adjunct to existing methods in the education of the deaf,

contains great potential value in a general way by providing additional practice in natural language and an opportunity for increased contact with speech. In concrete results, it demonstrates that the deaf may understand speech by "feel," with the speaker out of sight. The experiments have repeatedly demonstrated that after 50-70 hours of vibro-tactile training subjects who can feel speech and at the same time see the face of the speaker are able to interpret spoken discourse very much better than they can do by unaided lip-reading. At the same time the experiments have shown that the "pattern" of ordinary discourse, comprising the acoustic elements of speech—accent, tempo, pitch, periodicity, rhythm—which are so essential to the understanding of speech, comes more distinctly to touch (via vibration) than it does to vision (via lip-reading). Particularly as a supplement to speech exercises for the improvement of vocal expression does this new method show great promise.

In discussion, Dr. Goldstein pointed out the likelihood that all the senses are refinements of the elementary sense of touch and that heat, sound, light and electricity are all modifications of the same element of motion, justifying the assumption that all activity is fundamentally a question of vibration or motion. Dr. Goldstein also spoke of the possibility of the osiso, a device by which speech is converted into light stimuli, thus affording opportunity for minute study of its individual differences and characteristics by the eye, and that he had in preparation for use by teachers of the deaf a primer of speech pictures based upon the results of such study.

Dr. Fletcher here mentioned the possibility of sense stimulation, aside from vision and touch, by means of an electric current varying in frequency or spatially, applied by wire to different parts of the body. Dr. Dunlap also suggested that the vibratory sense persists after loss of the sense of touch.

Dr. Pike was of the opinion that biologically the re-

ceptor nerve endings can very rarely be made to perceive an electric current, and for that reason we have a very narrow range of discrimintion via electricity.

Upon inquiry by Dr. Pintner, Dr. Gault gave it as his opinion that there are "similar feeling" words just as there are "similar seeing" (homophenous) words.

The general topic of the utilization of remnants of hearing was opened with a paper by Mr. Forrester. The distinction between those children who at one time had normal hearing and those who never had this advantage becomes an important factor in this problem. Further considerations in the training of residual hearing involve first a thorough general medical examination and a special examination of eyes, ears, nose and throat; second, special training for teachers in how to train fragmentary auditory perception; third, equipment, and fourth, classification of children according to degree of hearing possessed.

For the purpose of auditory training, Mr. Forrester suggested the following classification:

1. Pupils who have become deaf after acquiring a good command of English.
2. Pupils who have 50 per cent hearing or more, which has never been utilized to any extent.
3. Pupils who have 30 to 50 per cent of hearing who are capable of gaining a hearing vocabulary after more or less extended training.
4. Pupils who have less than 30 per cent of hearing where the training process is still much slower, but whose principal object is the improvement of speech, though a limited hearing vocabulary may be obtained.

Mr. Forrester also pointed out the need of checking audiometer results with physical condition, weather, and mental point of view. In conclusion he declared that individual drill is what counts.

Dr. Wilson suggested that physical condition has a great deal to do with state of hearing; also, that the

human voice is not so effective as mechanical devices in the training of residual hearing, although there is difficulty in obtaining the proper apparatus.

Dr. Goldstein, however, felt that for acoustic training the voice, when exaggeration is not necessary, or the piano is more practical than special instrumental apparatus. He also pointed to the need of research on classification of congenital deafness, holding that of the two types, biological and pathological, the former includes a large proportion of children who have a considerable degree of "residual" hearing.

It was suggested by Dr. Dunlap that often auditory perception via bone conduction may be mistaken for actual vibration perception.

The contention was here made by Dr. Goldstein that sometimes improvement in hearing is possible physiologically after practice, but Dr. Fletcher replied that such improvement means merely increased facility with the "technique" of the test for hearing.

A paper on the instrumental and physical problems relating to the question of defective hearing was presented by Dr. Fletcher. The latter would classify deaf children into three groups:

1. Those who have sufficient hearing to get along when there is the necessary amplification, possibly all those retaining above 30 per cent of hearing. (In this connection Dr. Fletcher explained that amplification does not mean loud voice. In the latter case the elemental characteristics of speech are lost. Speech, however, may be amplified instrumentally without distortion).
2. Those who are totally deaf.
3. An intermediary group of all those who may get partial interpretation through hearing.

These three classes indicate the lines that the development of apparatus for use in training residual hearing should take. Dr. Fletcher would also apply a similar principle of classification to the hard of hearing as a

guide to the instrumental needs for each type of impaired hearing.

The afternoon session of the conference opened with discussion of Dr. Fletcher's paper. Dr. Guild called attention to the need of considering the distinction between flat type of deafness and tone island deafness. Dr. Goldstein remarked that no matter what the amplification is there will be no hearing if there is actual nerve deafness. Also, the question as to where hearing ends and tactile impression begins is an indeterminate one.

In a summary of the physiological work carried on under his direction at Johns Hopkins University Hospital, Dr. Guild told of efforts to determine the fundamental basis upon which the auditory end organ functions. For this purpose, his laboratory has been collecting a great number of actual specimens of the middle and inner ear and preparing them for microscopic study. Specimens are being prepared at the rate of 300 pairs a year, each pair backed by as thorough a clinical history as it is possible to obtain. Particular study is made with regard to tissue and other histological changes manifested in cases of impaired hearing. If possible, patients are given a thorough otological examination which, when death occurs, is related to detailed studies of the hearing apparatus after autopsy.

Speaking on the general aspects of the teaching of speech and lip-reading to the deaf, Miss Leonard referred to the great advances made in this field during the past half century, emphasizing especially the influence of Hubbard and Bell. Miss Leonard expressed the belief that the further cultivation of the sense of touch as applied to speech and research projects in fields allied with that of the education of deaf children would open the way to still further progress. The speaker made mention, too, of numerous instances of graduates of the Clarke School who had entered higher schools for the hearing and had been successful in their advanced work.

In the discussion that followed, joined in by Dr. Hall, Mr. Forrester, Dr. Taylor, and Mr. Driggs, mention was made of pupils from various schools who have made and are making good records in schools for the hearing. The general consensus of opinion was that with deaf as with hearing children the quality of all their work, including speech, depends in no small measure upon the mental caliber of the pupils and that in some cases work that is outwardly poor may really mean excellent attainment when innate factors are taken into consideration. As to speech, *per se*, many pupils of lesser mentality have speech of good quality.

Answering a question by Mr. Gruver, Miss Leonard stated that at the Clarke School the proportion of children who graduate into higher schools is equal to the general average in schools for the hearing. Dr. Wilson, referring to Bolton's "The Brain in Health and Disease," asked whether children who are born deaf are intellectually inferior, and Miss Leonard replied that in her experience this was not so.

Dr. Pintner followed with a list of problems suggested to him by the recent survey of schools for the deaf conducted by the National Research Council. These suggestions, printed in full in another part of this issue of the ANNALS, deserve the careful attention of all concerned with the education of the deaf. Their solution would mean a brighter day in the annals of our work.

A thorough review of the problems of the hard of hearing was offered by Dr. Berry. As the result of intensive study, it has been found that the incidence of defective hearing in public school children is greater than previously suspected. The state of the child with impaired hearing who is left in the ordinary schools soon resolves itself into a serious social problem, involving failure and needless repetition of school work, improper classification, personality defects and economic maladjustment. Dr. Berry stressed the need of formulating methods in teach-

ing hard-of-hearing children that would seek to overcome these limitations. He also stated that much good could come from a special study and standardization of mechanical aids to hearing.

Friday evening, the conference met again at informal dinner at the Hotel Carlton, the chief feature of the program being an address by Dr. Richardson on the work of the committee of the National Research Council investigating physical causes of deafness.

The session Saturday morning was opened by Dr. Wilson with a summary of the efforts of the American Otological Society to curb the inroads of otosclerosis. Definite data already gathered have established certain facts regarding this peculiar affliction. It starts early in life, it seems to be an occurrence in certain families, and otologists as yet can do little to arrest its course once it has gained headway. The movement to solve this problem has recently received great impetus with a fund given by the Carnegie Foundation to the American Otological Society, enabling the latter organization to institute ways and means of dealing with the problem. To direct the movement a special committee has been formed, and the following lines of attack laid out.

1. The preparation of an abstract of existing literature on the subject of otosclerosis.

2. The collection of all available information regarding family history and possible contributing influences in cases of otosclerosis, as a basis for study.

3. A microscopic examination of temporal bones that will bare the pathological evolution of the malady. There will be an examination of bone formation in the ear from the earliest stages of development in the fetus to maturity. This should provide the means for careful study of the histological variations possible, and point the way to findings on how to deal more effectively with this affliction.

4. The endowment of men, not institutions, to carry

on the active work. This will insure the interest of qualified experts.

5. The special study of calcium metabolism in families in which otosclerosis occurs.

6. The coordination of allied, and hitherto independent, studies at various centers so that the combined effect of all will be directed toward the major end.

Miss Adams told of a plan initiated by the Sarah Fuller Foundation in connection with the Horace Mann School by which a visiting teacher goes out to the homes of deaf children of preschool age to give them the proper preparation for their speech training when they enter school later. Miss Adams warned against the premature forcing of children into the confining atmosphere of school; in many cases they are better off at home. The lag or gap that exists between the native ability and the educational attainment of deaf children, as brought out by the Pintner tests in the survey, may be narrowed by more individual teaching, although it is true that present conditions do not permit this. The teaching of writing was also pointed out as of great value in schools for the deaf.

The question of the reliability of the audiometer was raised by Dr. Shambaugh, the statement being made that the fatigue element is one to be considered, that the reliability of the audiometer from day to day is very good, that "audiometer hearing" is not necessarily "language hearing," and that it is an instrument of investigation but not of much aid for practical otology.

Dr. Fletcher raised the question directly: Has the audiometer helped or not? Dr. Taylor, Dr. Hall, Dr. Fletcher, Mr. Gruver, and Mr. Forrester were of a positive opinion, namely, that it served as a "yardstick," perhaps not an ideal one, yet effective enough for the purposes of the school. It meets, even though not with the perfection desired, a need which previously had been neglected.

That hearing is a varying factor depending on the

individual's condition at the time and on differences in the voice of the speaker was further suggested by Dr. Dunlap, and Dr. Pike also supported the view that variation in hearing may be due to some internal condition over and above the peripheral aspects.

Dr. Hall inquired as to the possibility of obtaining reliable standardized tests for use with younger deaf children, and Dr. Pintner stated that the problem is not an impossible one, but would require careful study.

Dr. Paterson called attention to the need of giving greater consideration to the motor capacities of deaf children. The retardation, which becomes marked whenever a language test is involved, is lessened when the test is based on manipulating ability. This latter asset in the deaf has so far been sadly neglected in taking a measure of their mental capacity. This also has particular relation to trades teaching.

Mr. McManaway expressed appreciation of the outline of problems presented by Dr. Pintner and intimated that proper investigation into these problems would compel the complete reorganization of our entire present plan of educating the deaf. The crux of it all, according to Dr. Goldstein, is the need of better equipped teachers.

After outlining the progress already achieved in the education of the deaf, Dr. Hall in a paper on Educational Problems of the Deaf, pointed out a number of flaws in the picture that can be overcome only by earnest, concerted effort. Particular stress was laid upon the need of serious scientific investigation of the causes underlying the fact that deaf children in educational attainment are so far behind hearing children of the same native ability. The questions that have already been raised with relation to this great problem, and the many more that are certain to follow from it, should be the chief concern of educators of the deaf. Only careful unbiased study, supported by the combined effort of the schools, can bring these questions to solution.

The course of study in the ordinary school for the deaf, according to Dr. Taylor, may be an admirable one so far as it goes, but underlying it is a fundamental fallacy. The standard of graduation is based on the attainments of approximately twenty per cent of the pupils, comprising the semi-mute, semi-deaf, and very bright deaf children, and the curriculum is usually pitched to the requirements of these pupils. A large proportion of children in schools for the deaf never get beyond a fifth grade level of work, and another large proportion do not pass the third or fourth grade level. The school for the deaf, therefore, if it is not to stand askew, requires primarily a readjustment of its course of study to meet the needs of each of these three type groups.

The lag in the attainment of deaf pupils indicates that such children are behind themselves in their capabilities. These children, though, have demonstrated their capacity for development at an age earlier than we have hitherto suspected or acknowledged as possible, and Dr. Taylor expressed the conviction—the outcome of studied experiment—that it is possible to impart to deaf children very early in the school life a means of expression—language via reading—that is in no way an interruption to their speech or lip-reading efforts. In fact, it enhances the opportunities for lip-reading. To learn to read should be the first, not the last thing deaf children should do in school so that they may thereby be provided with an effective background for broader mental and educational development.

Another great problem referred to by Dr. Taylor concerns the adjustment of pupils who are ready to leave school to the practical matter of wage earning. The school under his direction has instituted a plan by which such pupils enter into an apprenticeship at a recognized trade school, or in a trade itself, supervision over such work being maintained by the school for the deaf.

Dr. Paterson suggested the importance of research

study of the emotional after-effects incident to the occurrence of deafness.

Dr. Newhart declared that studies in the State of Minnesota indicated that from 8 to 10 per cent of school children suffer from some form of defective hearing. The two chief problems that confront research, in his opinion, are (1) The efforts of otology to discover a remedy for unnecessary deafness, and (2) Improvement in means of detection, that will permit working with the preschool child in an effort to remove the conditions that are symptomatic of serious impairment of hearing later.

Here Dr. Hall pointed out the value of sympathetic collaboration by the respective elements represented at the conference.

Dr. Fletcher gave it as his opinion that the problems of the hard of hearing, inasmuch as the latter comprise a much greater proportion of the general population, should be of greater concern to the conference than those bearing directly on the education of deaf children. This view was further stressed by Miss Wright who stated that with the hard of hearing the problem of rehabilitation differs greatly from that of deaf children, and that the importance of studying the period of adjustment, particularly the emotional problem, in cases of sudden serious loss of hearing in the adult should receive special emphasis.

Dr. Bentley at this point submitted an outline of the subjects so far proposed at the conference, showing the variety of phases of the problem of defective aural function, as follows:

(1) Discovery; (2) Description; (3) Classification; (4) Pathology; (5) Treatment; (6) Education; (7) Social and economic aspects.

The avenues by which the above may be approached could be:

1. The individual members of the conference might avail themselves of the knowledge gained at this meeting

and return to their respective fields as individual investigators.

2. The continuance of the conference as a directing organization.

3. The enlistment by the conference of the influence of the Nationl Research Council in the cause of the major problem.

Dr. Bentley concluded with the suggestion that the conference invite the National Research Council to select a committee to be charged with four duties:

1. The collection and analysis of the matters dealt with at the present conference.

2. The collection of information on research problems now in progress.

3. The formulation of fundamental research projects for which there is further need.

4. The suggestion to the conference or the National Research Council of the best methods or agencies of carrying on these projects.

Suggestions as to ways in which research might be initiated were here offered by Dr. Pintner, as follows:

1. Research in the field of instruments of measurement, basic for the solution of many of the problems touched upon:

(a) intelligence tests
(b) achievement tests
(c) speech tests
(d) lip-reading tests
(e) hearing tests
(f) emotional tests

2. Curriculum research: What *are* the deaf being taught, and what *should* they be taught?

3. Establishment of a nursery school, as a laboratory for the study of young deaf children, independent of any existing schools for the deaf and conducted by experts in child study.

4. Inquiry into the questions of teacher training.

Dr. Gault proposed also the establishment of an "experimental class" in a school for the deaf to be carried through the curriculum under control conditions of observation. Only by some such plan as this can methods and theories developed in the laboratory ever be adopted for everyday use. In such an "experimental class" highly technical problems of widely differing character are bound to arise, problems in phonetics, otology, physics, etc. The problems thus raised, with the support of an advisory council, could then be allocated to centers where they could best be carried through.

Dr. Pike referred to certain theoretical aspects of the question of loss of auditory function. Recent experiments in physiology seem to bear out the contention of Hughlings Jackson that when there is injury in any part of the nervous system there is a take-up of effort by the rest of the system. Man more than any other animal has the power of compensation highly developed. If one of the afferent organs is shut off, there apparently is no diminution in the total level of expenditure of nerve energy. This means that when one of the conducting tracts becomes inactive, the other nerve pathways are doing more work than they formerly or normally would be doing. This explains why the receptor organs in the fingers—in the blind-deaf, for instance—may take on added acuity. Dr. Pike also raised the question as to whether in our tests we give sufficient emphasis to what the deaf can do with the senses that remain.

The report of the committee on recommendations rounded out the deliberations of the conference. This report, urging that a program of research be undertaken, recommended:

1. Appointment of a committee of not more than 7 members by the division of anthropology and psychology of the National Research Council to

(a) Digest and make available the matters brought out at this conference.

(b) Find and list research projects now in progress or provided for.

(c) Formulate a coherent program of fundamental reserch.

(d) Suggest approved methods and agencies of carrying out such projects.

2. Consideration of such fields of study as

(a) Investigation of the practicability of auditory apparatus now in use or proposed for use in the education of deaf children.

(b) Methods of measurement: in intelligence; in mechanical, motor and kindred abilities; in achievement; in speech; in lip-reading.

(c) Curriculum questions.

(d) Nursery school for very young deaf children.

(e) Emotional adjustment of the deafened.

(f) Problems of teacher training.

(g) Methods of rating usefulness of mechanical and electrical aids to hearing.

(h) Fundamental problems of audition, in both the normal and pathological states, including the anatomical, the mechanical and the quantitative phases of auditory function.

(i) Problems of the education, and social and economic adjustment of hard-of-hearing children.

By formal vote each of these recommendations was in turn adopted as the expression of the conference as a whole. Dr. Dunlap called upon the members to submit lists of names to guide the National Research Council in the appointment of the committee suggested in the report.

After an expression by Dr. Dunlap of deep appreciation of the work of the conference, the latter was formally adjourned.

The aim of the conference may have been to set in motion forces that will bring to solution the host of problems still confronting workers in the field of im-

paired audition. One gains the feeling that it was a forward-moving step toward that end. The representative character of the membership of the conference, the scope of its deliberations, and the interest which was developed in the major problems as an adventure in science as well as in philanthropy, afford convincing proof that the solutions sought await only coordinated effort. Competent direction is available. In this demonstration of enlightened leadership, Dr. Dunlap and the National Research Council have earned the sincerest commendation of all. We dare to hope that much good will be the outcome.

I. S. F.

ON THE EXTENSION OF THE USE OF THE SENSE OF TOUCH IN RELATION TO THE TRAINING AND EDUCATION OF THE DEAF[1]

The work I have in hand under the auspices of the Carnegie Institution of Washington and that I contemplate for the future radiates from my experiments at transmitting speech instrumentally to the organs of touch of a group of persons simultaneously. It is my object to get speech over to those organs in such manner that it can be felt distinctly; so that the forms of speech can be distinguished by their feel; so that those who feel it may learn to gain help at least therefrom in relation to the interpretation of speech, to the improvement of vocal expression in discourse, to improvement in reading and in relation to enjoyment of language and even of music. The work has many implications. On its applied side it invades most of the educational processes that are found in schools for the deaf.

The work as it has developed presents three distinct angles. It has a broad and varied scientific interest

[1]A paper read at the Conference on the Problems of the Deaf, Washington, D. C., January 20, 1928.

altogether irrespective of its immediate practical applications, but fundamental to them. It penetrates the field of psychology, and it has physics, neurology, phonetics and otology as very close neighbors, to say the least.

I will mention two or three of our findings that have a broader bearing than the immediately practical concerns of education, for instance:

1. We have found that the tactual organs in the skin can detect vibrational rates as high as 2,600 a second. This challenges the scientific interest of students of psychology, physics and neurology at the same time that it has important implications of a practical nature.

2. By the use of our organs of touch we can describe the patterns of connected discourse. (I mean rhythm and the succession of pauses, emphases, accents, variations in pitch and tempo). After a reasonable degree of practice this can be done almost without error judging from our experience with a list of 120 colloquial sentences. To a considerably less degree of accuracy one can describe the patterns of the vowel, diphthongal and consonantal elements of speech.

3. I have been speaking above of a situation in which all impressions are received through a single unit receiver (a receiver containing but one magnet and one moving part, like a telephone receiver) bearing upon one and the same small area of skin upon the tip of a finger.

But a new instrument designed and built for me by the Bell Telephone Laboratories enables us to surpass our results obtained by the single unit instrument. Here we have five vibrating units instead of one—or five contacts with the skin, one for the thumb and each finger of a hand respectively. A filter selects one group of frequencies of vibration for the thumb and for each of the fingers respectively so that when the experimenter speaks into a microphone that is a part of the system, the subject (or each one of a group of subjects) feels upon the thumb what corresponds to the speaker's low pitched tones; upon

the little finger, high pitched tones, and upon intermediate fingers what correspond to intermediate pitches. And here is an important result that we have so far obtained from the preliminary use of this instrument. When all fingers and the thumb are simultaneously upon their respective contacts on the five-unit receiver and when two or more of them are simultaneously stimulated there is no considerable masking of impressions upon one finger by coincident impressions upon another finger. That is: when long *e*, for example, is pronounced into the system and when the thumb alone is on its contact and all other fingers are off, it can be felt very distinctly upon the thumb. When the thumb is removed and the index finger alone is brought to bear upon its unit, the stimulus is felt distinctly upon that finger. Now if both thumb and finger be at the same time upon their respective units, the strong impression upon the thumb does not kill off the weaker one on the index finger. At most, there is a slight toning down of the distinctness of the impression as felt upon the thumb and finger respectively. Thus many widely differing tactual patterns of vocal elements and of spoken sentences are obtainable upon the organs of touch. The number of criteria of speech—possible signs of meaning and of language structure—are considerably increased by the multiple-unit instrument.

What I have been pointing out suggests that at least the pattern of speech can be got through the feel of speech—and not by one person alone but by a group simultaneously. Trial supports the suggestion. In other words, by feeling speech a group can simultaneously become acquainted with the distribution of emphasis, accent, pauses, varying pitch and tempo and rhythm in continued discourse. As a matter of fact this does not exhaust the advantages that can be obtained from spoken language through the sense of touch.

It is now quite apparent that this experiment at getting speech over from the mouth of a speaker to the touch

organs of a "listener", so to speak, has in it a great potential value in relation to the education and training of the deaf. It is fundamental in that relation because it very effectively aims at the development of language among them.

Let me mention here a few of the points at which it touches everyday affairs before I go on to describe concrete practical results.

1. It touches the work of those educationists who are concerned with the reception and interpretation of language by the deaf and the very hard of hearing as it is spoken and written.

2. It touches the development and improvement of speech and even of silent reading on the part of the deaf and the very hard of hearing. This aspect of the work attracts some educationists also, and some students of phonetics.

3. In the third place, to the extent to which this research is contributing toward a facilitation of the reception and understanding of spoken discourse and toward an improvement of speech, it is opening up a way whereby the deaf may find increased enjoyment of language in all its forms.

4. Finally, I have some evidence of a sort that cannot be neglected that the work when it is extended will open up a way whereby the deaf may enjoy some music. And I want to emphasize this: That whatever our cases can do with our laboratory apparatus they will be able to do likewise with the loud speaker of a radio set.

In this connection I want to acknowledge aid that I have had and am still receiving from engineers of the Bell Telephone Laboratories.

Now I shall state some of the concrete results of my laboratory work and add some comments.

1. We have demonstrated the possibility that a group of deaf persons may simultaneously learn to understand speech when the speaker is out of sight if only the mem-

bers of the group can feel his discourse. This presupposes approximately 300 hours of training at the very least. I do not say that this is a finding that can be put to immediate practical use, but it is a discovery of more than usual interest and one that has in it the potentiality of distinct future advantages.

2. Seven times we have demonstrated that after 60 to 80 hours of training in the aggregate a deaf person, feeling a speaker's voice instrumentally and seeing his moving lips and face simultaneously, is able to understand his speech from 30 per cent to 100 per cent more completely and accurately than he can do by the method of lip-reading alone. Two of these demonstrations have been made by strangers who have no personal interest in our laboratory method. If the subject is a first class lip-reader to begin with, the advantage from supplementing the eye with the sense of touch may be no more than 30 per cent. If he is a mediocre lip-reader the advantage may be as much as 100 per cent. This result is undoubtedly valid. Any further demonstrations of this nature would only confirm earlier results.

Why this advantage? In general there are two reasons. There is many a word in the English language that is matched with one other from which it cannot be distinguished by the lip-reader when they are apart from sentence structure. "Peat" and "beat" are illustrations. When they are within the structure of a sentence their meaning must be inferred from the context. A given word may be matched in this manner by two, three, four or more, up to a dozen others. Such words are described as "homophenous."

But while they cannot be distinguished by eye, the finger is able to tell the story. "Peat" and "beat" do not feel alike. Two years ago I spent one hour a day during six weeks working four deaf subjects on 103 groups of homophenous words. The problem was to determine how far the sense of touch alone could go as

compared with vision alone, toward discriminating homophenous words within the several groups. Among the 103 groups there were only seven in which fingers failed to make a substantial record. In all cases the report that followed attempts at visual discrimination (lip-reading) hovered about chance as would be expected of truly homophenous words.

These results help us to understand why vision plus feel bring better results than vision alone. But there is another reason. Through the sense of touch one readily becomes thoroughly acquainted with the "pattern" of spoken discourse. The distribution of accents, emphases, pauses, pitches; differences in tempo and rhythm; all these come more distinctly to the organs of touch than to vision. Altogether these characters make up the "pattern" of speech; and "pattern" alone is suggestive of meanings. This is a matter of extraordinary importance. I shall come back later to this subject of "pattern" but I want to draw attention with emphasis to this: in the feel of speech as a supplement to the vision of speech we have the possibility of greatly speeding up classroom instruction in schools for the deaf, *without separating the learners from our language as we speak it.* Let there be a dozen or more in the class, each one holding the receiver of the teletactor in his fingers while at the same time his eyes are fixed upon the face of the instructor. Let there be a microphone at the instructor's mouth or against his cheek. The subjects can then receive speech both by sight and feeling, simultaneously. Assuming the necessary training, they interpret it more fully and accurately as I have stated. In a given time, therefore, a deal more information can be acquired by a pupil than can be gained by the unaided method of lip-reading. And in this connection I want to remind you of what you already know very well: the more one knows about a subject, the more complete one's information about it, the more successful will one be as a lip-reader. Skillful interpretation facilitates ac-

quisition of information and this in turn facilitates interpretation. This mutual reaction is inevitable.

3. In the next place we are using the feel of speech successfully in relation to the improvement of vocal expression. It will go without saying that one must, in season and out of season, show the deaf-mute how to place his lips and tongue and must give him his tongue gymnastics and all of that. What I am talking about is a short circuiting supplement to customary devices—not a substitute. But it is a supplement that brings its own important contribution to the general result.

The success of our work in this relation is attested by dictating machine records taken before and after training; in one instance by a letter from a physician (a stranger to the writer) one of whose patients was last year a subject of mine. When he had seen his patient in March, after not having met her since the preceding September, he voluntarily wrote me his impressions. In the meantime nothing had been done for the case but what was being done in our laboratory.

Other evidence of our success in these relations is found in a systematic test. Early in the stage of drill a year ago, strangers were brought in to listen to our subjects as they attempted to read aloud. How many words could the strangers report? They were not permitted to see the faces of the readers while they were reading. After three months the situation was repeated. The same strangers and the same reading material were employed. In the meantime the strangers had not once heard the subjects talk and the subjects had been shut away from the test reading material. In the second case the strangers reported correctly upwards of 38 per cent more words than in the first instance.

At every step in our work relating to the improvement of speech we make our subjects feel the speech of the experimenter and his own speech also. Sentences and words first and elements last of all. This is our

way for building in one of the foundation stones of good speech—the kinaesthetic factor, the feeling of the movement of speech. I take my cue here from what must be the experience of the normal infant in his cradle. Speech as he hears it is in the first place only a series of bumps or shocks (each shock is what you and I sophisticated folk call a word or a syllable). By and by he observes that some of these shocks are heavier than others; he discovers a certain periodicity or rhythm, variations in speed or tempo and differences in pitch. In short he is obtaining what I have called the pattern of spoken discourse. He is getting the swing or movement of it and therewith the *feel* of the swing of it. This, I have said is one of the foundation stones of good speech. The lilt would be absent from your speech and mine but for this factor that we have got because we have ears to hear.

Now we are getting the same foundation stone into our deaf subjects through their skin. A six-year-old congenitally deaf girl who had not begun to speak before she came to our laboratory last October is learning, for example, to speak, to read the printed page, and to read lips. Every day and all the time in the laboratory she feels the spoken signs that correspond to the words and sentences that make up her daily exercises. In her speech work she feels her own word and sentence in her fingers, for she speaks into the microphone and against her own fingers as a part of her daily routine.

My hypothesis is this: that by reason of the much feeling of the spoken discourse the complete motor aspect of speech will settle down into the tissues of the organism and become an inseparable part of it, even as it has done in you and me by reason of our hearing speech.

Of course this process is helped in you and me by reason of the fact that we speak much ourselves, hear ourselves speaking and feel our vocal organs when they are in action. It is for this reason that we require the little girl to whom I have referred (and all our other

cases, too) to use her own voice in the microphone so she may feel her speech upon her own fingers and in her vocal organs simultaneously with feeling it upon her fingers. Something holds over in the organism from all these exercises. It is what I call the movement or pattern of connected discourse. A citation of a very commonplace experience of many of us may help you to appreciate what I am thinking about. When you have completed a three or four hundred mile motor ride within a day, when you sit down quietly in the evening reflecting upon the day's experiences, you feel yourself moving, as it were, with your car. Here is a hangover from the hundreds of thousands of motor adjustments you have made during the day. The same sort of thing persists after listening to music and participation in the dance. We are arranging the stage so as to secure a hangover of the delicate adjustments of speech. Along with the process comes improvement in speech.

It is important to observe that in our laboratory the feel of speech upon the fingers is the speaker's own check upon his manner of speech. Even more important it is to notice that here is an opportunity to get one deaf case to check another upon his manner of speech and to introduce an element of rivalry into a group. For when the members of a group are working together each with a receiver connected with the same microphone, it is one of the simplest things imaginable for now one and now another to recite or read aloud or speak in his manner against the fingers of his associates. If the next one thinks he can do better, he may try it and the whole class is the judge.

And this is so closely allied with one of our favorite laboratory exercises that I must describe it. The experimenter has a copy of a story at the microphone. Each subject in the group has his copy of the same story in one hand and the receiver in the other. I am assuming that the subjects have learned to read. While the experi-

menter reads into the microphone, the subjects follow their printed copies with their eyes and do their best to read aloud in unison with the experimenter's voice as they feel it. In this manner they acquire the movement of the experimenter's voice as he reads. Any one of the group can be called out to a duplicate transmitter at any moment to pronounce the last sentence into the fingers of his mates. Another thinks he can do it better and competition arises. Here is a way in which we can enormously multiply the use of the voice by the deaf. If a normal child of eight years of age makes 8,000 or 10,000 utterances daily—to be conservative, it ought to be possible by aid of the method I describe to get a respectable proportion of that number of utterances out of the mouths of the deaf. And that would be a substantial gain.

But one more observation upon this matter. In the course of all these exercises at reading in unison, the movement of speech will become, as many psychologists like to say, *conditioned,* to the printed page. Thereupon silent reading takes movement or lilt unto itself and this characteristic helps to carry meaning in silent reading as it does in speech. Withal it is an important contribution to enjoyment in reading.

All that concerning improvement in speech and in reading.

4. In the fourth place our work is contributing something to our subjects' enjoyment of language. There is a thrill from the sense of touch that is not obtainable through a distance receptor such as the eye. I have repeatedly reported that subjects have consistently expressed enjoyment of some verses and of some prose more than of others. This is not altogether because of the sense of touch in itself. It is in the organism's reaction to the movement of speech also, a topic that has taken so much of my time this morning.

One subject, furthermore, wearing a loud speaker upon his chest has consistently expressed pleasure not only in

the feel of spoken verses but in the feel of songs. These expressions did not come from him at the very beginning of practice by any means but only after a considerable period of training had elapsed. But when he did begin to report that one song was more pleasurable than another he was thereafter consistent notwithstanding that he was never told, either before or after, what song was being sung. This work has not been followed up, but I am convinced that here is a very promising starting point for useful research.

5. I have referred to the work of our six-year-old subject and I shall speak further of her, but briefly. I think I am nearly correct, if not wholly so, in saying that she discovered her own voice in the course of her earliest exercises with the teletactor. Her mouth was at the microphone and the receiver was in her fingers. Her mother held a duplicate receiver. When the girl made some babbling sounds at the transmitter she felt something going on in her fingers. This interested her. At the same time her mother indicated that she too felt something in her fingers. Thereafter it was difficult to keep the girl from the microphone, and the mother soon told me that her daughter was playing with her voice "ten times as much as ever before."

Whether she discovered her voice here or not, is, after all, not an important question. I know it is a fact that the feel of speech during all her laboratory exercises has whetted her interest, and in this alone is a very good advantage. It is no unusual thing for her to work three-quarters of an hour without change of problem, even to push her mid-morning luncheon aside in order to continue her exercises.

The number of hours she has spent at work in the laboratory since October 3 aggregates about one-seventh of the total number in a school year. In that time she has acquired 131 words which is more than half the vocabulary that is ordinarily expected of beginners after a full first

year in a standard school. This number does not include several present and past participles, conjunctions, and prepositions that in reading she grasps from their context.

These 131 words she understands when she at the same time sees them on the lips of a speaker and feels them vibrating against her fingers. All these words she can read when she sees them standing alone in print or in sentence structure in a continued story. She uses these words to compose sentences by printing with her own hand or by arranging cards upon each of which a word has been printed.

Starting from nothing on October 3 she has learned to utter fifteen words distinctly and more than twenty indistinctly. She tries to pronounce almost every word in her vocabulary and the sentences built up therefrom.

The girl is keenly interested in readers for primary school grades, particularly, of course, if they are illustrated. She enjoys pointing out words that she has learned when she finds them in these books or elsewhere.

She apparently realizes the practical use of speech. To the limit of her ability she uses it both at home and in the laboratory to express her wants.

In conjunction with all our other devices we are making very liberal use of some aspects of public school methods of teaching reading to hearing children, especially those that have been embodied in Professor Gates' method. This method we have had to adapt considerably, and it has been very useful. It is essentially a development of the principles promulgated by Cardano (1501-1576) and more recently (1922-1923) put to work by Professor A. Herlin in Belgium.

In conclusion, the research I am describing deals with the very fundamentals of education: that is, the development of language in all that the term implies, understanding the speech of others, vocal expression of one's meanings, reading the written or printed page, writing,

and, furthermore, enjoyment of all these activities. Inevitably it will ultimately run into every subject in the curriculum. Not only so but our fundamental practical studies of language development among the deaf bring us to a critical examination of the curriculum itself.

The objective of my experimental work, therefore, as I see it, embraces the foundations of the education of the deaf and the whole superstructure. I have no narrow conception of the problem. It so happens that until a year and a half ago I was concentrating solely upon the problem of transmitting speech to the deaf and very hard of hearing and upon their interpretation of it by way of the sense of touch alone. One usually cannot attack along the whole front at once. A year and a half ago I began to spend some time upon the vocal language of the deaf, to see what the use of the sense of touch could contribute to it, if any, beyond what it had contributed already.

We have uncovered some facts in these connections that are destined to be of extraordinary value. But I want it to be known that I am not so indiscreet as to believe that in the organs of touch alone is the key to all processes of education among the deaf. No man has a neck so long that he can see the whole firmament from one window. I have no one panacea for the ills of education in schools for the deaf. I have done enough work with the oscilloscope or osiso to convince me that we have by no means exhausted the possibilities of vision in our educational processes. And I have seen enough of educational processes in general to assure me that we can do considerable short-circuiting at more points than one. But exactly how that short-circuiting can be done can be answered only after considerable research into educational processes in concrete situations.

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THE PROBLEMS OF TRAINING THE REMNANTS OF AUDITORY PERCEPTION[1]

This subject is not one of my own choosing. It was thrust upon me by the honorable chairman of the Division of Anthropology and Psychology of the National Research Council. It came to me, however, as a challenge; and if it were to be discussed mathematically my observations would have to be limited to those cases where greater hearing had formerly obtained but only remnants now remained. To draw a dividing line between those who at one time had normal hearing and lost it and those who to all accounts never had normal hearing, is not an easy matter; for normal hearing lost in early childhood places the child so deprived in the same class as those who never had normal hearing—unless the child who previously had normal hearing retained considerable speech that could be of service to the teacher. From medical observations on the subject we have been led to believe that many with varying degrees of deafness never could have had normal hearing because of malformation of the ear, or maladjustment or missing links.

There are problems, however, that cover all types and degrees of deafness which call for consideration. Had I followed the usual present-day practice in compiling my paper, I should have sent out large statistical forms on the subject to be filled in and returned. These blanks would have been accompanied with promises of reciprocity. I have, however, an aversion to statistical blanks, and as the Christmas festivities had already begun I felt that I could not in all conscience dampen the Christmas spirit of peace and goodwill among brother members of the profession. What I have to say therefore is "Rochester made" but will, I trust, provoke some little discussion.

There are certain things to be done in every school

[1]A paper read at the Conference on the Problems of the Deaf, Washington, D. C., January 20, 1928.

when the pupils are admitted. Every child is entitled to a good general medical examination and a further special examination of eyes, ears, nose and throat. An audiometer examination of first-year pupils is not to be depended upon as we have often found; but an examination should be made and the results recorded as soon thereafter as practicable. This instrument is now an essential in a school for the deaf. It is easy to manipulate and has little to get out of order. By the general use of this instrument—and it is close enough for ordinary testing—a standardized code is possible whose markings will be intelligible to all educators of the deaf. Badly diseased tonsils and adenoids should be removed, nasal troubles corrected, and the weakly, ill nourished child specially dieted and built up. This is the only foundation on which to build.

One of the problems has been to obtain trained teachers in this particular field. Many of our teachers at the present time have not made a special study of the training of the remnants of auditory perception. They have specialized in training their own auditory perceptions to distinguish faulty speech in others; but special training and experience are necessary to train children to understand and interpret what *they* receive imperfectly. Speech correction is, of course, an accompaniment in both cases. Where funds permit, a special teacher for auditory training is I think good, though I can conceive of teachers having classes small enough to allow for daily individual work along that line. There was a time in the history of the education of the deaf when it was considered a serious neglect of duty not to give oral instruction. The time is not far distant when failure to educate residual hearing will be considered in the same light.

Another problem is that of equipment. Some instruments are very costly—too costly; but there are some on the market which are very good and can be purchased at prices within the reach of all. There are few schools which do not possess pianos; but even without instruments there

are many cases where the human voice unaided is the best and most natural medium. I refer to those cases of course where there is a large percentage of hearing. Indeed I know of cases where I think the use of instruments is not helpful but on the other hand decidedly detrimental. The voice may gradually lose much of its natural quality and become mechanical and this has to be guarded against. I believe we are getting better pitched voices to-day than ever before. I remember the time when you would find high pitched effeminate voices among strong sturdy boys and voices with anything but feminine sweetness among the girls.

Another problem is classification. You cannot go through the school with a wide-toothed rake and collect all those of fifty per cent hearing and then with a garden rake those of fifteen per cent, as language thistles would forever appear.

Is it not absolutely necessary to discern the special need of each pupil and give the work specially suited to the individual need? There might be in a class of eight pupils two with fifty per cent hearing or over, three with forty per cent and several under thirty per cent. Each group obviously calls for different treatment. I am now thinking of a class which has been in school for some years and without previous auricular training.

For our present purpose we might make four classifications:

1. Pupils who have become deaf after acquiring a good command of English. These need auricular training to help them retain the sounds of the language already known to them as well as to help them become familiar with new language. They further need it for speech correction.
2. Pupils having fifty per cent hearing or over and which has never been used to any extent. Such pupils have an absolute right to auricular training and may soon acquire a large hearing vocabulary that would not always demand a hearing device.

3. Pupils having thirty to fifty per cent of hearing who are capable of gaining a hearing vocabulary but necessarily taking a very much longer period for the process.
4. Pupils having less than thirty per cent hearing where the process is still much slower but whose principal objective is the improvement of speech, though they may also get a limited hearing vocabulary.

How is a class containing one or more pupils in each of the above groups to be trained most effectively in the time allotted? The honorable chairman did not ask me for a solution, only a statement of the problem!

Another thing while I think of it—unduly loud speech on the part of the teacher should be discouraged. I see no good purpose to be served by it. It destroys resonance —also the teacher's voice. If very loud speech is necessary to make the pupil hear, then use a hearing device.

We referred to a certain classification of pupils but there is another factor which is not a negligible one. Given equal degrees of hearing will you get equal degrees of interpretation? There is inequality in interpreting speech through the ear as there is through the eye. The intelligence quotient and a quick sense of putting together words that fit and make sense, enter in. It seems impossible then to have a perfect classification for group work.

If you have a mixed group, is this not what happens, first vowel, consonant and syllable drill for some, then words and phrases for others. One will get the sibilant "sh" but another will get the labial "b" or the nasal "m" before "sh"; which leads us to the conclusion that individual drill every day is what counts. This means more money, more equipment and a certain interruption to the grade work in other subjects.

When should auricular training begin? Personally I think that for those with less than 35 per cent hearing, the first year's work should consist more of

general sense training plus instrumental stimulation for basic work. With second-year pupils we have this year been getting results which we believe justify the time spent on them. To get the most possible out of the training there is no doubt it should begin with the younger children, that is, if we want them to acquire a hearing vocabulary. Auricular training of children of eight years of age with 5 per cent hearing would be justified even if only for rhythm, pitch and accent. A boy with 5 per cent hearing seventeen years of age, born deaf, and belonging to a family where there are three other deaf children, has been receiving auricular work with a machine during the past year and is now able to get the proper accent of words as he never could before. Since I have seen what can be done with such a case I am more optimistic about results from this work than I have ever been before. We shall not restore hearing, and audiometer tests in many cases may not record improvement; but there will be an education of the ear to sound, a stimulation of the different parts of the ear and through these a stimulation of the brain centers which I believe will all go to making a more normal boy or girl.

I have tabulated a list of fifteen pupils who have had regular work for over a year and their audiometer readings may interest you.

		September, 1926		January, 1928	
		Right	Left	Right	Left
1.	R. B.	30	45	30	45
2.	S. M.	30	50	40	40
3.	A. V.	20	20	25	25
4.	I. W.	20	30	20	30
5.	H. F.	45	20	55	45
6.	P. O.	40	30	45	45
7.	L. S.	30	40	30	45
8.	M. H.	35	55	40	55
9.	E. T.	40	35	45	40
10.	L. H.	15	25	20	35
11.	J. C.	25	5	25	10
12.	F. C.	45	40	65	65
13.	E. S.	50	60	35	35
14.	I. H.	50	20	55	20
15.	W. M.	35	35	30	30

You will notice that in some cases there has been practically no change in the readings, though most are now able to understand many words when spoken at close range and make use of their hearing to an extent they never did before. In the case of young pupils and also in the case of older ones, five degrees may not mean much; in some cases it indicates a cold in the head or a change in the weather. What may sometimes be put down for improvement in hearing may simply indicate a keener mental attitude. The pupil becomes more expectant and knows what to anticipate; and he will respond at the slightest indication whereas formerly his impression had to be much more intense.

In the case of the fifth pupil the improvement was due to the clearing up of a bad physical condition of the ear. In the case of the sixth there is a great improvement in the boy's physique. He was an extremely nervous and ill nourished lad when he came to us. He has infinitely more self control and is now more robust, and this I believe accounts for the greater improvement.

In the case of the twelfth there has also been great improvement in the boy's bodily vigor, while in the case of the thirteenth there has been a serious catarrhal condition.

In checking up the audiometer readings of twenty-five of the senior pupils after a year's auricular work, there are twelve who register exactly the same as at the beginning of the period of instruction; ten who record only a difference of five degrees in one ear—six of the ten plus differences and four minus. Of the remaining three, one shows a minus difference of fifteen, one a minus difference of ten, both catarrhal cases, and the third a plus difference of ten.

A very brief outline of the course used for correcting speech of advanced pupils of varying degrees of language hearing ability may be of interest.

I. For corrective speech work chiefly, with or without sight.

1. Prolonging all long vowels beginning with ä o, later shortening them.
2. Differentiating all long vowels, giving two and three at a time.
3. Low and high pitch using these vowels.
4. "m" and "n" prolonged.
5. "m" and "n" used in combination with long vowels forming first syllables, then words:

   mä mo
   mi na
   my name
   I know
   May I?

6. "sh" given in the same way, as well as all other consonants.
7. Differentiating long vowels with initial consonants forming words.

   Example: a boy (oi), a bow (o)
   a toy a toe

8. Short vowels developed from the long vowels and used in words for contrast.

   Example: oo oo
   shoe shook
   a good shoe
   I should go, etc.

9. Differentiating words with same consonants but different vowels:

   take took
   blow blew
   hide hid

10. Drill on words with the same vowel and different initial or final consonants:

    meat beat
    cup come
    bark mark

11. Numbers, the alphabet.
12. Days of the week.

13. Vowel combinations as used in words:
    Example: i u leading to li u, li un (lion)
    i e leading to qui e, qui et (quiet)
    etc.
14. Words, phrases and sentences to show accent:
    fa′ ther Thank′ you
    good bye′ to-day′
    Sa′ tur day yes′ ter day, etc.
    Shut′ the door
15. Conversational sentences and quotations given for phrasing.
16. New words pronounced for accent.
17. Short poems read for rhythm.

II. For those who are acquiring or trying to retain a hearing vocabulary, the following is given through the ear alone, with no speech repetition except in cases where it is customary to repeat.

1. After the first steps as outlined are given, conversational expressions are developed by giving the vowels first as:

    ow ă oo ?

    for

    How are you?

    oo ă ur oo

    for

    Good afternoon.

2. Questions to be answered.
    What is your name?
    Where is your home?
    Do you like — — —?
    Do you know — — —?
    Did you go — — —? Etc.
3. Short stories and news items read for understanding. (Questions asked on the same.)

The above is merely a skeleton outline but shows the general plan.

To dogmatize in auricular work is to place upon it the stamp of finality and the remarkable improvement in recent years in the construction of machines for transmitting sound as well as for receiving impressions leads one to believe that it hath not yet appeared what may be accomplished. We are but on the threshold.

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THE SURVEY OF INSTITUTIONS FOR THE DEAF[1]

I have gone over the report on the Survey of Schools for the Deaf as published in the ANNALS. Five papers have been published so far.[2] I do not intend to describe the survey but merely to point out certain aspects of it and especially to direct your attention to possible problems that might be worthy of your consideration for further research.

The survey is noteworthy because of its extent. It included forty-two schools having a pupilage of 8,000 or about fifty per cent of the total number of deaf children in school. Tests were given to about 4,000 children or about twenty-five per cent of the total number of deaf children in school. Furthermore the geographical distribution was good.

Audiometer Tests.—Several tests or measures were made. Let us deal with them first. The audiometer was used. I was amazed to note that 1.8 per cent have 75 per cent or more hearing, presumably normal hearing, and 12.8 per cent have fifty per cent or more hearing. That made me raise the question,

1. What is the reliability and validity of audiometer readings?

[1]A paper read at the Conference on the Problems of the Deaf, Washington, D. C., January 20, 1928.

[2]ANNALS, Vol. LXX, pp. 391-421; Vol. LXXI, pp. 97-135; 284-348; Vol. LXXII, pp. 2-34; 377-414.

By reliability I mean the correlation between two tests of the same children given close together. Further, we should have such measures of reliability for different age groups; for different intervals of time. By validity I mean the correlation between audiometer readings and criteria of ability to hear speech. How accurately does the audiometer predict the ability to hear speech? This measure would be difficult to get because there is no standard for speech, but I feel we must know a great deal more about these factors than is indicated in the report. Perhaps these things are already known. I am merely raising the question.

If so many deaf children have so much hearing, question 2 follows:

2. What percentage of hearing is necessary for ordinary hearing school instruction?

Can this be determined and within what limits? And so we come naturally to number 3.

3. Would this differ with different amounts of intelligence?

The amount of hearing necessary for a child of high intelligence to participate in hearing instruction would in all probability be much less than for a child of lower intelligence. Furthermore, within the so-called deaf group itself I would raise the next point.

4. The problem of different methods of instruction for children having different amounts of hearing.

The survey measured the hearing of only 161 colored deaf children, but there was an amazing difference between them and the white. While only 2.9 per cent white are reported to have zero hearing, 13.6 per cent colored have zero hearing, and so on all down the line. So we come to questions 5 and 6.

5. Why have colored deaf children such a markedly smaller amount of hearing?

6. Is this due to a more stringent selection of colored deaf, or does it reflect the lower intelligence of the colored, or both?

If we assume a lower intelligence score for the colored

as contrasted with white, this naturally raises question 7 for all children:

7. To what extent are audiometer results conditioned by the intelligence of the subject tested?

The survey further showed—what many of you expected—a marked difference in hearing between day-school and residential school pupils; a day-school median between 31 and 35, a residential median between 21-25. Why this selection? And so we have number 8:

8. The question of the selective influence of the day-school with reference to amounts of hearing.

Speech-Reading Tests.—For the first time extensive speech-reading tests were made. These tests were constructed carefully to include all sorts of sounds. The tests are a good first beginning, but they lack the objectivity of standard tests. We have no evidence of their reliability or validity. So we come to number 9:

9. Construction of many forms of such tests, graded in difficulty, with known validities and reliabilities.

But all such tests or scales will be influenced greatly by the particular persons applying them, so that for accurate research purposes we need to go much further. Hence I suggest number 10:

10. Construction of a standard cinematograph scale for the measurement of speech-reading, perhaps ten similar forms, ten different faces.

The sentences here would be graded in difficulty from very easy to very hard. Some scales would deal with disjointed sentences, others with continuous discourse. To build such scales as indicated in 9 and 10, we would need, however, to know what material to employ, and hence problem 11:

11. Study of common material taught in schools for the construction of such scales.

This in itself might well be the work of a year or so. And I have not gone into the difficulties of the child's response (whether oral or written), nor yet into the dif-

ficulties of scoring such responses. When such basic scales have been constructed, we might then hope to go more fully into the problems suggested in number 12:

12. The relationships existing between accurate measures of speech-reading, and age, intelligence, length of school attendance, age of onset of deafness, degree of hearing, method of instruction, etc.

Intelligibility of Speech Tests.—These tests were based upon selected sentences read to the field agent and to the teacher. The difficulty of scoring such material is pointed out in the survey. The subjective nature of such tests is obvious to all, so I raise question 13.

13. Construction of standard scales for this. Are objective measures possible?

Can an instrument be constructed to make objective measures possible? If we can get reliable measures then we can hope to attack such problems as I have noted in number 14:

14. The relations between this and age, intelligence, length of school attendance, age of onset of deafness, degree of hearing, method of instruction, etc.

Obviously the use of such objective tests would be crucial in determining the value of different methods of teaching speech.

Psychological Tests.—The tests used, the Pintner Non-Language and the Pintner Educational Survey, are the only tests useful for group testing of deaf children. But they are more than ten years old. To-day we have developed techniques for the construction of better scales. Furthermore, we need tests for younger children. We need achievement tests specifically applied to the curricula of schools for the deaf, hence follow numbers 15 and 16:

15. The need for new, longer and better non-language tests for the measurement of intelligence of deaf children.

16. The need for many different types of educational achievement tests.

I mean new, longer and better group tests covering the whole extent of a deaf child's schooling from his entrance into school up to his graduation. The construction of such

tests is laborious and costly and cannot now be undertaken by the individual research worker unaided. I have not raised the question of individual tests, but much remains to be done in this field as well.

It was very noticeable in tabulating the data concerning deaf children that the latter enter school much later than hearing children. Taking this fact in conjunction with the present-day interest in the hearing preschool child, I arrived at numbers 17 and 18:

17. Experiment with preschool education of deaf children.

18. Experiment with progress of deaf children entering school at early ages.

A preschool for the deaf might turn out to be an excellent laboratory that would throw light on many of our problems.

A study of the scores for day-schools and residential schools shows the former achieving more than the latter in educational work, after allowing for the slight superiority in the intelligence of the day-school pupils. So we get to number 19:

19. Investigate the seeming superiority of day-schools in educational achievement, holding constant intelligence, age of onset, amount of hearing.

Some light on this has been thrown by a graduate student at Teachers College, Mr. C. C. Upshall, who is studying a group of 311 day pupils matched with 311 residential pupils equated for chronological age and intelligence score. He finds in this case that the day-school group has a reliable superiority in educational score, amount of hearing and later age of becoming deaf. Perhaps the two last factors explain some of the discrepancy under discussion.

All through the survey the possibility of investigating language in general and its relationship to thinking and mental development has occurred to me and so I have put in number 20:

20. The investigation of many theoretical problems as to the relationship of hearing and language, and the possibility of substituting or adding other means of language development.

In comparing children taught by different methods of instruction, we always find that orally taught pupils have on the average higher intelligence scores. The oral method would seem to select the brighter pupils. Why is this so? This suggests question 21:

21. Is there a lower limit in intelligence below which it is unprofitable to teach by the oral method?

And when we have the basic scales for measurement we might experiment with actual teaching groups as suggested in questions 22 and 23:

22. The measurement of progress in different types of oral instruction by means of accurate tests.

23. The measurement of progress in many mixed methods of instruction.

Are speech and speech-reading so important for the deaf in later life? How much do they make use of either? Instead of arguing about Binet's results, let us do as suggested in number 24:

24. The repetition on a wider scale and in a more precise manner of Binet's investigation into the use made of speech and speech-reading among the deaf after they have left school.

The Deaf and the Hearing.—A comparison of the scores for the deaf with the standards for the hearing shows a marked difference. In the non-language test they are below the hearing. The mean 12-year-old deaf score equals the mean 10-year-old hearing, and so on for other ages up to 15, where the mean 15-year-old deaf equals the mean 12-year-old hearing. No sign of compensation for loss of hearing is noted by keener perception of pictures, diagrams, movements, as demanded by the tests. Now when we turn to the educational verbal tests this gap between the deaf and the hearing widens enormously. Here we have mean 12-year-old deaf equal to mean 8-year-old hearing (about Grade II) and so on up to mean 15-year-old deaf equal to mean 9-year-old hearing (Grade III). An enormous gap and no sign of catching up during these years as the deaf child grows older. Why is the gap in educational attainment so much greater

than in intelligence? Can we correct this discrepancy? That is what I mean by question 25:

25. Can the gap between intelligence and educational achievement of the deaf be closed?

Naturally this raises the question as to the reason for this, as suggested in 26:

26. Is part of this gap due to poor methods of instruction, faulty curriculum construction, lack of proper teacher training?

Experimental work in reading, such as that conducted by Dr. Arthur I. Gates would come under this heading. If some of the difficulty is due to teaching, we need to know more about the teachers of the deaf as compared with teachers of the hearing and this suggests number 27:

27. How do teachers of the deaf compare with teachers of the hearing in ability, training, etc.?

The Questionnaire.—From the miscellaneous information gathered by the questionnaire, a multitude of different problems are suggested.

There seems to be no definite policy with reference to feeble-minded deaf children, and thus number 28:

28. The feeble-minded deaf, by whom should they be diagnosed and where should they be trained?

The analysis of the previous training of the teachers now in service seems to show all types of previous education and so question number 29 is suggested:

29. What should be the training of teachers for the deaf?

In the discussion of trades training we find no definite policy for the choice of trades for pupils. The problem is very difficult and so I would raise question number 30:

30. Is it possible to develop prognostic tests to help in selecting pupils for different types of trades training?

The analysis of textbooks used in schools for the deaf, shows many books used, some prepared by educators of the deaf and some not. Which are better? This suggests our next question, number 31:

31. Experiment with different types of reading textbooks for deaf children.

There are practically no special arithmetic texts for deaf children. Why not? This is suggested in number 32:

32. Why are there no textbooks in arithmetic for deaf children? The value of special texts.

Little is said about the teaching of writing. We should know more about it. Its significance should be studied as suggested in number 33:

33. The value of writing as an aid to language development among the deaf.

In schools for the hearing we find a more or less uniform system of grades, but in schools for the deaf there is no such thing, not even a common nomenclature, so that to say a child is in the third grade means nothing as to the standard of educational achievement attained. So I suggest the next topic for discussion, number 34:

34. The introduction of a uniform system of grades and standards of achievement.

The survey concludes that teachers of the deaf show little professional spirit, and so number 35 is suggested:

35. The arousal of a better professional spirit among teachers of the deaf.

And in this connection we must raise the problem of where teachers should be trained. Are they not segregated too much from the other teachers? These are questions raised by number 36:

36. Where should teachers be trained and who are competent to teach them?

The survey shows that schools for the deaf as a rule are well provided with motion-picture machines. It would seem that pictures might be an especially valuable aid for training the deaf. I know of no special study in this connection, hence I suggest number 37:

37. A study of the value and use of motion pictures in the teaching of the deaf.

Whether the survey is correct in reporting that 80 per cent of deaf children leave school before graduation, I do not know. The figures given in the report,

however, are startling enough to make us raise the problem I have suggested in number 38:

38. A study of the reasons why deaf children leave school before graduation.

Deaf people follow various occupations. Are they filling all the different types of work suitable to them? Would number 39 be useful?

39. A survey of occupations possible for the deaf.

And, lastly, does the present training of deaf children fit them as well as possible for the type of work required in later life. And so we come to number 40:

40. A study of the value of present trades training in school for the later life-work of deaf individuals.

These are some of the questions that occurred to me in going through the report of the survey as published to date. I do not know how many of them are wise; I do not know how many or which of them if would be most profitable to investigate. It is for a conference such as this to decide.

RUDOLF PINTNER,
Teachers College, Columbia University,
New York City.

EDUCATIONAL PROBLEMS OF THE DEAF[1]

In speaking to-day I shall not refer to the many problems which confront our hard-of-hearing friends, whose education has proceeded in the usual way, but shall mention only educational problems of deaf persons whose schooling takes place in special institutions of learning, with the hope of calling up the general discussion of such problems.

A glance at the history of the education of the deaf in this country since its beginning a little over one hundred

[1]A paper read at the Conference on the Problems of the Deaf, Washington, D. C., January 21, 1928.

years ago shows us an interesting and satisfactory picture in many respects.

The idea that institutions for deaf children are charitable asylums is fast going by the board. It is now recognized that every deaf child in the Union has a right to an elementary education at the expense of the community in which he lives. A considerable term of years is granted for such education, and the law more and more is requiring that the deaf child of school age must be in school as well as his hearing brother. Sixteen thousand deaf children are in our special schools to-day. State schools, city schools, private and denominational schools for the deaf have been established in such number that the capital invested runs into many millions and their support requires millions of dollars annually, most of which is forthcoming from the public funds. Speech is taught even to congenitally deaf children. The speech of the adventitiously deaf learned at home is improved or preserved. Lip-reading is given to nearly all who enter. Much successful oral teaching is done. Manual training and trades teaching for older pupils have been carried on with much success. Since 1864 hundreds of deaf young people after graduating from state and other schools have received higher education in our own collegiate department. A number of intelligent deaf young men and women have carried on their higher education successfully (at least as far as marks go) in colleges for the hearing. A number of graduates of Gallaudet College and other deaf people have received higher degrees than the baccalaureate in first class universities. The well educated deaf have entered the fields of architecture, business, bacteriology, chemistry, dendrology, engineering, home making, the ministry, printing, publishing, and teaching, with a high degree of success.

The last census will show that in 1920 the adult deaf-mutes of the United States (deaf-mutes meaning persons losing speech entirely or becoming deaf before the age of

8 years) were self supporting to nearly the same extent as hearing persons.

Some may ask then, Why meet to discuss educational problems of the deaf? Are there any left to solve?

Yes, most decidedly there are.

There are still blots in our picture which mar its pleasant aspect. The wrong kind of politics still controls some of our schools. The public is still unaware of the capabilities of the educated deaf in many kinds of work. Our schools are not sufficiently in touch with one another and with employers. Our industrial training is not everywhere keeping up with that of the public schools generally, and many apparently promising trades are not yet taught. Too much standardization of school practice is leading to routine and the forcing of particular methods of instruction by law is threatening our progress. Many small schools are being established without competent supervision. The ideas of educated deaf people both at home and abroad receive little attention. We are suffering from low salaries; our turnover of teachers is too large; we lack trained teachers; and we lack men teachers. Much of the speech work done in our schools has resulted in partly unintelligible spoken language of small value to the pupil. There is a disappointing lack of classification of pupils as to hearing and other standards. Physical examination and medical attention in some of our schools need much improvement. There is a woeful lack of instruction in subjects of high school grade almost everywhere, though for years one of our schools of moderate size has carried on such work regularly and successfully. Indeed our problems are many and our picture is not without its blemishes and its dark shadows.

Problems of industrial education in our schools I shall say little about, though they need investigation and betterment to improve our picture.

I offer the following suggestions for the partial solution of this class of problems:

An industrial department in each large school, headed by a well-educated specialist.

More attention to industrial education of our girls.

A traveling representative in each school of fair size, part of whose duty would be to visit industrial plants and business organizations, keeping in touch with former pupils, and particularly with the demand for skilled work which deaf people may be taught.

More time given to industrial training in the last years of school, especially to slow pupils.

Summer industrial courses in at least some of our larger institutions at suitable centers throughout the country.

Some of the blemishes in our academic work may be touched up and our picture made more attractive without deep scientific investigation. There is no good reason, for instance, why in time we cannot obtain better salaries for our teachers and better medical attention for our pupils. But many of our problems do need special and serious scientific study. The greatest shadow of all, part of the blackness of which may come from the overlapping of a number of the less important of those shadows already mentioned, is that our deaf children in educational attainment are years behind the standard reached by their hearing brothers and sisters of the same age and native ability. This fact has been shown clearly by the investigations of Dr. Pintner, and others, through the examination of over six thousand deaf school children during the past few years. It ought not so to be.

If we are to show to future generations a more beautiful picture of our work, if we are to progress educationally, if we are to place our handicapped children into a more and more complex life with hope of maintaining or improving their splendid record of self support, we should close as far as possible this educational gap by successful investigation of its causes and by the application of the proper remedies.

Dr. Pintner in the last November ANNALS has raised some very pertinent questions in regard to this great prob-

lem of the advancement of the educational ability of our deaf children to the point where their native ability shows they ought to be.

Some possible solutions of the problem are suggested by him; the earlier entrance of deaf children to school; the teaching of reading at an earlier age; the use of some of the time now used in speech teaching and lip-reading for the acquisition of a wider vocabulary; changes in curriculum; and better training of teachers.

To these suggestions I would like to add some questions. Can we ever hope to solve our problems till our teachers may make their work a life profession? Are we paying sufficient attention to the classification of our pupils in accordance with hearing, with intellectual ability, and with reference to their future occupations? Could we gain in our educational work by lengthening our school year for deaf children? Can we combine sight and touch and possibly hearing to improve the speech and speech-reading of pupils now beset with difficulties and so save years wasted trying to use one sense alone for this difficult task? Are we using sufficiently the sense of hearing, both with the natural voice and with mechanical devices, to develop a large vocabulary? Why did the early survey of Dr. Pintner, Dr. Paterson, and others, show that manual methods produced unusually good educational results with slow children? Why in the more recent survey does one of our largest day-schools show such a splendid record of educational attainment, and why at the same time does a residential school, also large in number and employing a different method of instruction and one somewhat unusual, stand at the top of over forty schools in educational results?

Dr. Pintner's suggestions need investigation. Certainly some of the questions which I have asked need answers. That educational gap must be closed. The National Research Council has already gathered many facts in regard to our schools, their courses, their equipment, their pupilage, their teachers, and their educational work. As

Dr. Pintner says in closing his article in the ANNALS (to which I have already referred) "The way is now clear for further prolonged investigation and experiment." The Convention of American Instructors of the Deaf and the Conference of Superintendents and Principals of American Schools for the Deaf have urged the Columbia Institution for the Deaf to establish a permanent research department to enter into such work. Our directors, believing our location, our physical property, our pupilage—this year from over forty schools, our continuous contact with many schools over the whole country, are particularly advantageous, are ready to join in definite plans for such work as soon as funds are available.

But more, much more, than money will be needed. There must be hearty cooperation of our schools; we must ask Dr. Taylor to continue his good work in early language building, and New York State to undertake experiments in classification; we must call on the Census Bureau for the gathering of statistics, on the ANNALS for the use of its pages for publication, and we must ask the Volta Bureau for valuable information which it has or can obtain. We may have to follow the children of the Rhode Island School through Montessori work to graduation. We must cooperate with Mr. Manning and Mr. Forrester in their training of residual hearing. We shall need the help of such scientists and inventors as Dr. Fletcher and his staff, of Dr. Pintner, of Dr. Gault, and of other psychologists. We shall want the assistance of otologists and of experts of the National Research Council. We shall need the help of educated deaf people. And most of all we shall need a carefully developed plan for unbiased study, and judgments, by broad-minded investigators, under proper central control seeking not for what any one of us may hope is true, but for the truth. Then we shall see our problems solved. "For the truth shall set you free."

PERCIVAL HALL,
President of Gallaudet College,
Washington, D. C.

A PRESCHOOL EXPERIMENT

The Sarah Fuller Home for Little Children Who Cannot Hear, in West Medford, Mass., was founded in 1888 by Mrs. Francis Brooks and other philanthropic persons. Miss Sarah Fuller, the principal of the Horace Mann School in Boston, was an enthusiastic believer in the value and practicability of teaching speech and language to very young deaf children, and the Home was established and named in her honor to provide an opportunity to carry out her ideas. It was really an experimental nursery school.

The Home cared for ten children with loving tender care, under the management of a board. The state contributed to the expense, but assumed no authority.

The educational results differed greatly during the thirty-seven years of the Home's existence. There were some periods when wonderful lip-readers and speech-users came from its doors, and other periods when success was less positive.

Organization and personnel changed in various ways as the years went by, and each change always entailed increased expense; until in 1925, the per capita cost had become so great that the board did not feel justified in continuing the enterprise.

Expenses had been met in three ways: interest on endowment, private subscription, and state aid.

The question immediately arose as to the proper use of the endowment, which had been given for the specific purpose of teaching speech and language to young deaf children. After much investigation and discussion the board decided upon a plan and put it into operation in December, 1927. A description of this plan follows.

An experienced teacher of young deaf children, Miss Dora I. Gay, was engaged to go to the homes of little deaf children for two purposes: to instruct the mothers in ways of reaching the children's intelligence; and to teach the children by the oral method.

There had always been a close relation between the Horace Mann School and the Sarah Fuller Home, and the principal of the school undertook to put the teacher on the track of proper candidates for the proposed teaching, and to aid the undertaking in other ways. Finding pupils proved to be very simple. Parents of young deaf children are always coming to the school for advice, and a list of these children is kept. Miss Gay and the principal attended the December meeting of the Boston School Nurses and laid the plan before them, securing their instant hearty and enthusiastic cooperation, and the help of various other social agencies was invoked, so that Miss Gay was able to visit four homes the first week.

It at once became evident that geography would be a controlling factor in the plan. South Boston, Roxbury, Brookline, and Winchester look near together on the map, but distances lengthen out when one has to depend on trolleys. The board was generous in the matter of taxis as local timesavers, however, and Miss Gay soon organized her week in such fashion as to give maximum service with the smallest amount of traveling possible.

Some families she visits five days in the week, some three or two, or one. The pupils are of differing types. Bright little ones of four who will enter the Horace Mann School next year she gives an hour of teaching four or five times a week, with regularly progressive work in sense-perception and speech. To younger children she goes less and attempts less. One backward child of whom she has hopes she visits frequently; and another, where the prospects are very doubtful, she visits once a week, more to encourage the mother than with the expectation of definite educational results.

In every case the mother, aunt, or grandmother is present at the lesson, and is given instruction in procedure for the time which will elapse before the next visit.

Discipline presents many difficulties, but the teacher loves children and long experience has taught her how

to be both firm and kind, so that she is beginning to find amenable little people waiting eagerly for an orderly lesson.

There are eight on the visiting list now, and plans are already afoot for another teacher.

Miss Gay makes a weekly written report to the secretary and tells her story informally at the monthly board meeting.

Not a great deal has been accomplished yet, but it seems as though we even now can "faintly trust the larger hope."

MABEL ELLERY ADAMS,
Principal of the Horace Mann School,
Boston, Mass.

THE COLLEGE ANGLE THROUGH STATE SCHOOL INTROSPECTION

Much ado has been made over the policy that should be followed or advocated by the superintendents of the schools for the deaf in the United States and Canada with reference to the program of expansion of Gallaudet College. Thus far, in considering the subject, we have indulged mostly in objective observation. It is frequently easier to look outward than inward; in other words, to observe the other fellow rather than to look in upon ourselves. True to human traits, the least line of resistance is generally followed. Let us try a little introspection. And for the purpose let us compare what is going on in the schools for the deaf with that which is going on in the public schools of America.

One of the most interesting things that have taken place in the United States during the past twenty-five years is the rapid growth of high schools. We all marvel at the almost unbelievable progress made by science and invention during the past quarter of a century. As wonderful

as this is, the growth of the modern high school surpasses it. How many million-dollar high schools have come into existence within recent years? A good example is given in a recent number of the *Nation's Business*—Hibbing, Minnesota, High School. Many others can be cited.

The phenomenal growth in the enrollment of these high schools is of vital concern to all of us. Twenty-five years ago, the enrollment was slightly more than a half million. Now it approximates four million. Hence, there are eight times as many high school students to-day as twenty-five years ago, while the entire population of the United States is only one and one-half times what it was twenty-five years ago. In other words, the high school enrollment has increased during the interval under consideration five and one-half times as fast as the population as a whole.[1]

What has this to do with the schools for the deaf? This. It means that our own graduates leave the school to face the strongest competition that has ever existed in the commercial field. It means that the hearing brothers and sisters of our deaf pupils have a decided advantage to offer the employer over that which the deaf are able to offer. The high school graduate from the public school has at least three years of education to offer which our graduates lack, for the work of our graduating classes corresponds closely only to that of the freshmen year of the fully accredited high school of the public school system. Not only do our graduates lack three important years of educational equipment as compared with the hearing boy or girl, but they also are further handicapped by their deafness.

In equity, this situation should be reversed. The average high school graduate of to-day has a good start in several very important subjects and the knowledge of these subjects stands him in good stead when he enters the keen competition of the employment field. Knowledge

[1]Bulletin, 1927, No. 39, Bureau of Education, Department of the Interior, Washington, D. C.

of such subjects as chemistry, physics, mathematics, and agriculture offers marked advantages to the graduate of the modern high school, while a lack of such knowledge places our graduates at a serious disadvantage when the struggle for existence begins in earnest. Few of the schools for the deaf include chemistry in the curriculum; the course in physics is too light to permit of any practical application, and the course in mathematics carries the student to quadratic equations only.

The fully accredited high school curriculum includes geometry, both plane and solid, trigonometry, and good courses in chemistry, physics, and agriculture. Many of the high schools use Milliken and Gales' "Practical Physics" as a textbook, which is put on the market by Ginn and Company for high school courses. According to the catalogue, this same text is used in the third year at Gallaudet College. These subjects, and many others which do not appear in the curriculum of the school for the deaf, properly belong to the modern high school course, and students who master them have a far better chance for securing employment when the search for work begins, and a much better chance for advancement after the job is landed than do those who have never come into possession of this knowledge. Having received a good start in certain subjects and having secured employment, the fortunate recipient can then continue his study into the advanced phases of that particular subject having a direct bearing upon his work, thereby making possible a more rapid scaling of the ladder of advancement.

In the early years of the period under consideration, thousands of towns were unable to offer their school population four complete years of high school work. Many could offer only one year, others two, and some, three years of work. The consolidated school was still in its infancy. Graduates from the one-year high school could not bridge the intervening gap of three years' work which stood between them and the university and were

consequently denied admission. In the same manner, and for the same reason, graduates from the two- and three-year high schools were unable to enter the university or any of the full-fledged colleges. However, with the rapid development of the modern high school these gaps have disappeared and the eligibility lists of the great universities have grown by leaps and bounds.

With the on-coming crop of a half million high school graduates each year, it is little wonder that our colleges and universities are becoming unwieldy under the stress of mere numbers. When our schools for the deaf have fully established accredited, four-year courses of study, Gallaudet College can reasonably expect, if the two cases are analogous, to experience a growth similar and in proportion to that of our state universities and other institutions of higher learning. This growth will be gradual at first, then increase rapidly for a few years and finally flatten out, if history repeats itself.

The three upper grades of the high school include the most important work and the most difficult. This is the part of the high school course that the schools for the deaf are not offering to their pupils. Our graduates with their additional handicap of deafness are less able than their hearing brothers and sisters to bridge these three important years of college entrance requirements and are, therefore, less likely to find their way into institutions of higher learning.

The pathway of honor leading directly into the main entrance of the great university or full-fledged college, is paved with honestly-won credits cleaved from the solid substance of the modern high school curriculum. This honor route is clearly marked by well-defined rules established by organizations such as the North Central Association of Universities and Colleges, that sprang into existence at the time the modern high school movement was getting under way, the object being to standardize entrance requirements and establish "accredited lists"

among high schools able to comply with the essential conditions.

School superintendents and high school principals are constantly on the alert to keep their schools on the accredited list. Armed with these widely accepted credits at the time they present themselves at the doors of the great university or the well-known college, our graduates will not be denied admission because of deafness, but will be allowed to tackle the problem ahead of them with the assurance that, if they can show passable grades at the end of the first school year, they will then be eligible to take up the second year's work. It is sincerely hoped that at least some will venture into our great universities, though it is anticipated that the main current will head for Gallaudet College at Washington which no doubt will be ready to receive them when the time comes.

Graduates of our schools for the deaf have barely scratched the surface of this great storehouse of knowledge contained in the course of study of the modern high school. They have not gone into any one subject deeply enough to create a craving for further study. The beauty of such subjects is not to be found on or near the surface, but, like the beauty of the sea, is often found at the bottom. Without this inspiration, it is unfair to our graduates to expect them to gain much from home study.

It is time for the schools for the deaf to establish first class high schools comparable to the best of the modern day high schools. This does not refer to size, but rather more specifically to subject matter of the curriculum and the character of the teaching. The deaf ask for a fair deal. Under the present system of education they are not getting it. With million-dollar high schools on all sides of us, and with the advent of the consolidated high school of the rural district, practically every boy and girl of the land, except a few who happen to be deaf, have the good fortune of having within easy reach these modern giants of education.

While this amazing development of the modern high school has been going on, we can see by looking in upon ourselves, that our schools for the deaf have remained at a standstill, so far as high school work is concerned. Our graduating classes have just about completed the freshman year of the modern high school, and the system leaves to Gallaudet College the task of giving to them the remaining three years. This same condition existed twenty-five years ago. The man who said: "We must run as fast as we can these days to stay where we are at," had a fair conception of the meaning of progress. Before the modern high school movement gained appreciable ground, our graduates fared better in the employment field than they do to-day. We have not been running as fast as we can. and we are not where we were "at" because the modern high school has forged ahead of us. Now, in the language of the street, we are going to have to step on the gas to catch up.

Twelve years is the allotted time assigned to the youth of the land in which to secure a common school education—eight years in the grammar school and four in the high school. Reasoning by analogy, it was naturally concluded, in order to equalize things, that the deaf, too, should be allotted twelve years in which to obtain their education. It was a beautiful thought, and the argument was all right excepting the one serious fault: the major premise was wrong.

For more than a quarter of a century the deaf have been getting the worst of this piece of false logic. All of us know and freely admit that the deaf, educationally, are retarded from two to five years when compared in this particular with their hearing brothers and sisters. Three years is a low average. Giving due consideration to this fact, the analogy alluded to above breaks down and instead of allowing twelve years in which they are to obtain a common school education, the deaf should be al-

lowed fifteen years as a minimum if things are to be equalized.

Yes, it is a long time. But if the graduates of our schools for the deaf are to have even a fighting chance to put bread on the table and a little cash in the strong box, we must give them a modern high school education. Failing in this, we must watch them struggle along with life's problems in a more lowly field where only those with a grammar school education are competing and wherein the standard of wages is low.

The additional appropriation required in adding three years to the course of study will represent only a small percentage of the total required for the whole school. For most of the state schools the additional three years will not increase the enrollment more than thirty pupils in the beginning, and it will require three years at least to effect the change. However, as parents and our own pupils see the advantage and the necessity of the four-year high school course, it is quite probable that our high school enrollment will increase as has been the case in the public school system.

In adding three years to its course of study each school for the deaf should give heed to the natural resources of its respective state with a view of determining the major subjects of the revised course of study. Since the State of Iowa is better than ninety per cent agricultural, the major subject of our revised course should be agriculture.

Incidentally, the expansion of the state schools will relieve Gallaudet College of three years of high school work, which it is doing at present, and permit it to retain unto itself the two years of college work proper. At the same time, college authorities will have the longed-for opportunity "to build out, and particularly, to build up," and in the end establish a fully accredited four-year college course.

Also, the injection of the modern high school idea into schools for the deaf will enable the various states to do

the fair thing by our deaf boys and girls by bringing their educational equipment up to par, so as to include four years of fully accredited high school work which every normal boy and girl of the country is now privileged to enjoy. Then, and only then, will graduates from the schools for the deaf have a fair fighting chance in the field of competitive employment which grows keener each year.

O. L. McINTIRE,
Superintendent of the Iowa School,
Council Bluffs, Iowa

BROADER TRADES INSTRUCTION IN STATE SCHOOLS FOR THE DEAF

Discussing the changed conditions in the printing trade to-day, and advocating a corresponding change in our methods of instruction in printing classes, Mr. Frank B. Smith, instructor in printing in Gallaudet College, has an interesting paper in the ANNALS for May, 1927. This paper has been reproduced in a number of our school publications. The ANNALS for November, 1927, carries a reproduction from the *Inland Printer,* on the subject of what is wrong with our trade schools. This stresses the points previously brought up by Mr. Smith, and holds closely to the idea that in narrower courses for the individual amounting to specialized practice rather than in the giving of broad instruction in all branches of a trade lies the solution of our troubles. Mr. Smith especially "would discourage the practice of teaching a student a 'smattering' of knowledge in all branches of the several printing trades."

Naturally, coming from a man engaged in trades instruction among advanced deaf pupils, Mr. Smith's paper can well be accepted as the fruit of valuable experience. Yet the educational policy advocated in his

paper and again in the reproduction from the *Inland Printer*, however well it may agree with the advanced work conducted in Gallaudet College, and in trade schools for the hearing, is one fraught with danger to the educational success expected of our state schools for the deaf.

Mr. Smith evidently takes the situation in trades instruction in our state schools for the deaf to be the same one he faces in Gallaudet College. He very clearly takes the advanced ground of the vocational instructor among mature pupils engaged in finishing off their apprenticeship period. This is an error frequently made nowadays.

I have several times taken occasion to point out that state schools for the deaf, as now graded, err in regarding their industrial work as seriously vocational. This error is costly to the pupil, in an educational way. When we consider the broad opportunity industrial work offers in dealing with pupils whose normal reasoning powers are as yet undeveloped, such as we find among fully ninety-five per cent of the pupils in our state schools for the deaf, we can better comprehend the extent to which any curtailment of the educative background in trades instruction in favor of specialization can have a harmful effect. To correct this error, we must recede from the position that we are doing real vocational work in our state school shops, and proceed to attack this work from an entirely different angle by reorganizing our school shop courses wholly along broad, prevocational lines.

Correlation of academic and industrial work in our state schools for the deaf has been eagerly sought after for a number of years. Some have felt encouraged that they were getting it through language practice in one department based upon activities in the other. Not until we reorganize our attack can we hope to have true correlation. The opportunity for correlation between academic and shopwork lies far in advance of anything yet accomplished along the simple line of making shopwork the subject matter of live language in the classroom. The

real opportunity for correlation, as state schools for the deaf are organized and graded to-day, lies more along the line of taking the academic department into the shops than in the way of our previous struggles to take the shops into the academic department. In other words, we have been attacking our main problem at the wrong end.

Practically all efforts to get real vocational work out of industrial departments in our state schools, even to the extent expected from high schools for the hearing, meet the same stone-wall opposition: the mental deficiency of the average pupil, his immaturity and lack of ability to think beyond a certain elementary point, and his glaring inability to reason from cause to effect. We simply cannot advance the average pupil industrially farther than he stands academically. Not even the ideal industrial instructor, yet to appear on the scene, can expect to attain vocational results with state school pupils as they are graded nowadays, to the point where the job opportunity might reasonably be expected to follow the graduation fact.

Naturally, we can expect to get better results in our state school shops by employing better trained instructors who understand how to prepare a systematic course in their specialty, and how to follow it. But even these instructors cannot hope to do work of an advanced technical nature requiring well-trained minds and reasonably well-developed observational and reasoning powers. No industrial instructor can get his pupils farther ahead than their academic training will permit.

It is freely granted that many deaf youths are really skillful in a manual way, and can do creditable tool work long before they are capable of spelling an intelligent reply to a question relating to their work, or to follow understandingly printed instructions. However, such a workman is merely imitative, and under modern working conditions he might expect to be passed up by the first

prospective employer who asked him the simple question: "What can you do?"

From observations made in a representative state school for the deaf over a period of seven years, I have concluded that the average boy is graduated just when he reaches the point where he might be considered really teachable; just when he begins to respond, to ask intelligent questions, to think, to argue, to take an interest in his work and the knowledge that he now realizes lies back of his work. Having so concluded, I am working on the theory that the main part of the advanced technical training of the deaf need lies just ahead of the present state school course; either in years to be added to the present course before graduation, or in a junior college, or in a special trades school department in some existing college or university.

With provision made for this advanced work, our present state school courses must be revised and perfected along prevocational lines to the end that each pupil may develop the broadest possible industrial background. The simpler trades should come during the pupil's younger years, the more difficult ones as he grows older and more capable of understanding. The course in printing, for example, should be reserved for the very last, taking in those who have reached their highest development. It is a sad waste of time and effort to put a fourth-grade deaf pupil at the case. It is likewise a sade waste of time and of the pupil's opportunity, to leave him in one trade for eight or ten years, starting him there when he is too young to know what he would really like to follow for a life work. Of course, he can be expected to acquire a certain degree of skill by repeating operations year after year, and comes to be depended upon to do the institution work given him; but he is being denied a full, free opportunity to broaden himself industrially, to become familiar with as many ways of making a living as possible. His social horizon is perforce narrowed, and no

one can truthfully say that he is being fitted to take his place as a really intelligent citizen.

Who are we, in a state school for the deaf, who set ourselves up as judges of a deaf boy's future occupation? How can we hope to foretell in just what line a bright boy's opportunity lies? For what reason should we feel justified in denying a schoolboy the fullest possible chance to exercise his hidden talents by insisting that he should begin early to "specialize," to acquire an automatic ability as a press-feeder, or as a keyboard operator, or as a nailer-on of half soles, simply because mature men in industries are required to "specialize?" The latter fact should have absolutely nothing to do with the industrial training of a schoolboy. Any specialization needed, or felt to be desirable by the pupil himself after his mind is trained to the point where he is capable of knowing himself, his abilities, or of sensing his hidden talents, should come later in his school life, beyond his state school days as now designated, by every law of common sense. For it is only when he is ripe for graduation from our state schools that he becomes really teachable.

Industrial work demands reasoning power over and above mere language facility. Many a pupil may have a mechanical mastery of language without showing any marked reasoning power such as geometry or physics require. But strong reasoning powers, based upon keenness of observation, are necessary to the boy who hopes to be more than a laborer, in the face of competition for jobs in any industrial specialty worth while. This may be illustrated by a little story.

Not so many years ago, common wood screws such as we use to-day were manufactured without points. Machines could only make them straight, and in use a hole had to be bored first, then the screw turned into the hole. One day a workman was assembling a framework of wood and metal parts. He made a slip, and the framework collapsed, with rending and twisting of parts. In straightening

things up again, he came upon a screw which had been twisted down to a tapering point.

Just supposing this workman had been a deaf pupil in one of our schools, supposing he stood there with that twisted screw in his hand, what would he have done with it?

Well, the workman around whom this story is built didn't do this. He studied the damaged screw closely. He realized that he had something big. How had that point been formed? He painstakingly rearranged the framework and screw just as they were before the accident, then deliberately caused the collapse as before while he watched what happened to the screw. He discovered the mechanical action which was later applied to a machine for making pointed wood screws such as we use today.

Was it language facility that brought this about? Was it specialization in the application of wood screws until his motions had become systematized after the manner of the Ford plant worker whose job was to put on Nut No. 58? Not so much as observation and reasoning power, plus familiarity with trade history sufficient to enable him to understand the need of a pointed screw. He possessed the mentality to realize that he had discovered something of value to the trade. Is there not a lesson here for us as we seek to reorganize our trades instruction, to do the most we can by the young people in our care?

Any degree of inefficiency which may be apparent in an educational system which encourages the practice of teaching a student a "smattering" of knowledge in all branches of a trade is more than off-set by the less likelihood of the student's dabbling about in his later years in other trades which seem to him, upon first contact, to be attractive, at a time when his welfare is more apt to depend upon his will to stick to one line of work. At present we are all familiar with the answer usually given

to the question: "What per cent of your graduates follow the trades taught them in school?"

We should not attempt to give detailed, technical training in any one trade under the misleading title "vocational work" to a state school deaf pupil, as now graded. Instead, we should attempt much more in the way of giving a broader industrial and social background leading to a better comprehension of life in general and of the pupil's hidden talents. Our chief concern should be to bring him to the point where he can make an intelligent choice of occupations by the time he is ready to graduate, when he should be well qualified to enter upon a course of intensive training in a specialty, which should, in a comparatively short time, fit him to meet existing competition with adequate confidence.

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THE SURVEY OF SCHOOLS FOR THE DEAF—VII[1]

Day-Schools—Physical Features

As with residential schools, a study was made of the physical features of the 13 day-schools included in the survey, the personal observations of the visiting representatives of the National Research Council furnishing the data upon which the analysis was based.

LOCATION OF SCHOOLS

All the day-schools have of course an urban location, and all also have the advantage of easy access by both rail and trolley. This, coupled with the fact that all but two are centrally situated, makes the location as a rule quite satisfactory with respect to accessibility.

Six of these schools are located in residential sections.

[1]Continued from the January, 1928, issue of the Annals, pp. 1-36.

Two are in the midst of business centers, and the remaining five schools are close to varied industrial activities which may include mills, foundries and factories. For the schools not located in residential centers, it must be stated, the attendant noises and disturbances of heavy commercial traffic are hardly conducive to quiet school work. At least six schools could probably be better served by a different location—two if they could acquire a more central situation, one if it could obtain more convenient transportation facilities, and three if the school could be established in a more quiet neighborhood. For one of the last-named group, plans were practically ready at the time of the survey for the erection of a new school, part of which was to be given over to classes for the deaf, in a strictly residential section.

SCHOOL PLANT

Grounds.—The average day-school does not possess extensive grounds. According to the information obtained, the site may include

One city square (350 ft. by 500 ft.)
Three-fourths of a city square
One-fourth of a city square
Between 2 and 3 acres
1½ acres
1 acre
Approximately 1 acre
137 ft. square
100 ft. by 200 ft.

In two additional cases the school building takes up the entire site.

In one case also the school for the deaf is merely part of a great congregate municipal school center that includes a large public elementary school, a junior high school and senior high school, and a normal college, making in all a school population of 5,000 individuals. In this case, the entire school grounds comprise 20 acres, of which 686,000 square feet are in campus and a little over 11 acres in athletic grounds.

In only 2 other cases is there anything resembling a campus, and that only a small grass plot.

Despite the meagerness of their grounds, 7 of the 13 day-schools studied manage to provide satisfactory play ground. In 3 other schools the play space, taking into consideration the size of enrollment, is not adequate; while 3 schools have no playground whatever.

Buildings.—The question of school housing, as it relates to the day-school plan, may be best presented by grouping according to age.

Group I.—This comprises those school buildings erected during the twenty-five years preceding the survey (1900-1925) which may properly be called "modern" structures. In all, 7 of the day-schools are included in this group.

School 1. Here the building, erected in 1924, is a splendid brick fire-proof structure of 15 rooms used as a public school, in which a number of classrooms are reserved for the deaf children. However, it has been necessary to place two classes of deaf children, with two teachers, in the same room.

School 2 and 3. The former, built in 1922, and the latter in 1917, are both excellent up-to-date buildings that meet the needs of a day-school admirably.

School 4. This has already been referred to as part of a great city school center comprising different units, three buildings serving all.

School 5. Constructed in 1914, this is well suited for its purposes.

School 6. In this case a brick building, erected in 1900 and formerly used as a high school has been turned over for the double purpose of a vocational school and a school for the deaf. In addition to the main building, the second floor of which is used by the deaf children, there is an adjoining annex and an outside gymnasium. The general condition is only fair.

School 7. Approximately 25 years old, this building is in good condition, but it is not entirely given over to the use of the deaf pupils.

Group II. This group includes the 6 day-schools whose buildings were more than 25 years old at the time the survey was made.

School 1. This is a typical one-building city school, erected in 1890 at a cost of $90,000. It has been kept in good repair, but is now two small and cramped for the needs of the school.

School 2. More than 40 years old, this is a typical old-style high school building with wide halls. Although still in good condition, it will probably be disposed of for business purposes as the site is very valuable. The deaf pupils have the use of three rooms which,

however, are located too close to the main entrance where there is much noise.

School 3. Built in 1880, this is an old-style brick public school building, kept in fair condition, and reasonably suited for the work of a school for the deaf.

School 4. This school is housed in an old wooden structure comprising 3 portables, two of which are detached. Its condition is good, but it is hardly suited to the needs of a school; there is very little plumbing, and it is heated by stoves.

School 5. Here the building, very old, is in poor condition, out of date in every respect and quite inadequate for a large day-school.

School 6. This school consists of two buildings, a brick structure 60 years old, in fair condition, and a house of very good type a block away as an annex. Both answer well the purposes of the school.

Since the survey was made, 4 of the 6 schools in Group II—schools 1, 4, 5, and 6—have had new buildings of the most approved type, especially equipped as schools for the deaf, completed for their use.

Schoolrooms.—The size of classrooms, according to cubic foot allowance per pupil, and window space appear to be satisfactory in practically all the day-schools visited. One school where this was not so was soon to have a new school plant built.

In at least 8 of the day-schools the lighting of the schoolrooms is satisfactory. In the others this is only partially so, although in a number of these cases this and other schoolroom defects are to be remedied in the projected new buildings. In only 1 of the 13 schools was the ventilating system found unsatisfactory. In 6 of them open windows alone are relied upon, in 5 others there is a fan and shaft system, and in 1 other case air is pumped in and the windows also are used. A majority—8—of the day-schools visited use good slate class boards. The others depend upon various types of composition, paper and painted board. In practically all the schools the seats and desks used by the children are modern and adjustable, usually the Molthrop type. Other furniture in the classrooms may include a variety of equipment, principally desks, tables, bookcases, bookshelves, chairs, and cabinets.

A number of special schoolroom features noted include cabinets for holding maps and charts, especially spacious ventilated clothes closets, an excellent ventilating system, a special telephone system, sliding blackboards, well chosen pictures, plaster models of famous men and women, reproductions of works of art, vases for flowers, and cupboards.

Two of the 13 schools have no auricular equipment. All the others have at least a piano for this purpose—in one case two pianos—supplemented usually with speaking tubes, or a selection of one or more of the following: audiclares, drums, ear phones, audiometer (in only 1 school at the time of the survey), whistles, acousticon, harmonium, cymbals, tambourines.

Most of the schools also, 9 of the 13, are equipped with an ample supply of maps, charts and illustrative material.

Shops.—Only 3 of the 13 day-schools are equipped with print shop facilities, and in one of these the apparatus is not in use. In the other two the equipment consists, in one instance, of press, cases of type and paper cutter in a small room, and in the second, of power press and type. In still a fourth school, the pupils have access to equipment in a junior high school with instruction from a trained teacher, mainly of a prevocational nature.

The boys in 12 of the schools take woodworking, but this in each case is only an elementary course in manual training, and at best the equipment consists only of benches and bench tools. Further, in 3 of the 12 schools the pupils do this work at a nearby public school which is provided with the necessary apparatus.

A majority—8—of the schools also have equipment available to teach cooking and sewing, although in a few instances this equipment is in connection with a neighboring school for hearing children.

Gymnasium.—Five of the 13 day-schools have no gymnasium facilities. In one other instance the pupils use the gymnasium of a school close by, and in still an-

other school the assembly room, equipped with dumbbells, clubs and wands, is used. In the remaining 6 schools the gymnasium itself is quite satisfactory, with a sufficient supply of modern apparatus, although in one instance no use is made of the facilities available because there is no instructor. In the few schools, possibly 6, where provision is also made for indoor sports, basket ball seems to be the most favored.

Playground.—Only 4 of the 13 day-schools provide play facilities. In one case baseball is the only activity; in another, basket ball and handball, both boys and girls using the same grounds; in a third there are poles and ladders and provision for basket ball and baseball under the supervision of the physical training teacher; the playground in the fourth school in this group is furnished with swings, rings, slides, teeters, and giant swing, and the sports provided for include basket ball, tennis, volley ball, soccer, and indoor baseball.

Six of the day-schools studied have no special playroom arrangement. In 2 other schools, the playroom space, located in the basement, is cramped and poorly lighted and ventilated. In the remaining 5 schools, the playroom provision is quite satisfactory as to size, location, air and light.

General Condition of Plant and Equipment.—It might be well, at this point, to give a summary of the general condition of plant and equipment, and the plan, if any, for growth and expansion of the day-schools studied. The symbols used to identify each school are the same as those used in other sections of this report.

D-1. This school is a building of many years standing erected at two different periods, the older part now being used by the classes for the deaf. The general condition is good. Its central situation probably explains why it was originally chosen as a school for the deaf.

D-2. The school is in perfect condition and the plant is complete for its purpose.

D-3. This school, not more than 10 years old at the time of the survey, is modern in every respect, and is kept in excellent repair. It is fireproof throughout, well lighted and well constructed. To serve the needs of the city, probably another school on the same plan should be erected in another location.

D-4. Here the school, used principally as a city high school building housing nearly 800 pupils, presents a good appearance though of an old-fashioned type. It is, however, kept in good repair. It is too noisy an arrangement for the school for the deaf. A less noisy location would be desirable, but as the school is so accessible, probably no move will be made to place the classes for the deaf elsewhere.

D-5. At the time of the survey this school was housed in two structures, a main building and an annex, both in good condition and adapted to the needs of the school. Since then a splendid new building has been completed.

D-6. This is a modern school building, complete for all the needs of a day-school. However, there is no room for growth without encroaching upon space provided for play.

D-7. The building is old but substantially constructed and kept in good repair. A new building, especially designed for use by deaf children, is to be erected.

D-8. Here the school for the deaf is housed in a large public school of about 500 children. The building is very well kept, but because of the din of outside traffic and the coming and going of the other children, the classes for the deaf may be transferred to a new building later on.

D-9. This is a building which, although not given over entirely to the use of the deaf, is at least satisfactory for their needs. It is in good condition, and no change is at present contemplated.

D-10. This is the school previously referred to as part of a great city school center with a total population of

approximately 5,000 children. The part of the plant used by the deaf is satisfactory with respect to physical condition.

D—11. The school building is an old condemned wooden structure, to be torn down. A new grade school is to be erected in which the deaf pupils will have 4 rooms and an auditorium. The new site comprises 6 acres, so there will be ample playground.

D-12. Here too the building was found to be old and entirely inadequate for a large school for the deaf. Since the survey it has been torn down and a model school, especially equipped along the most approved lines, erected on the same site.

D-13. This school is housed in an excellent public school building of the latest type, but the space allotted to the classes for the deaf is hardly sufficient for their needs.

MEDICAL CARE

Equipment.—Only 1 of the 13 day-schools has equipment for dental work within the same building; in another case there is complete equipment available at a public school but a short distance away. Facilities for eye examination—and scanty at that—are provided in three of the schools, in one case only charts. Only one day-school, also, has a clinic arrangement within the same building for the examination of ears.

Eleven of the 13 day-schools have the services of a physician on regular salary paid by the city board of education. In one other case a prominent otologist has given the school special attention for almost twenty years without remuneration, making a visit to the school once a week. A set of instruments for the use of his clinic at the school has been purchased by the parents association. Four of the schools also have in their employ a dentist and an oculist as specialists.

All of the 13 schools have a trained nurse on a schedule of regular visit which may be three quarters of an hour

every day and five hours one day a week (in this case a very large school); daily; four times a week, with additional calls at the homes of pupils; two half days a week; once a week; and once a year.

A physical examination is given children at time of admission in 8 of the 13 schools, and in one other case as soon thereafter as possible. Further, in only 2 schools is an examination made of the children when they return after the summer vacation, nor does any of these schools demand an examination at the close of short vacations. The physicial examination is a periodic affair in 9 schools—once a year in two of them, once each semester in two others, and in another the examination deals only with head, teeth and skin.

In 7 of the 13 day-schools vaccination against smallpox is required of all the pupils. In another there is a rule to that effect but it is not enforced; in another this is compulsory only during times of epidemic; and in still another school the children are vaccinated unless the parents refuse consent. Also, in none of the day-schools studied are the pupils required to take inoculation against typhoid fever. Wassermann tests are administered only on medical advice, usually in connection with suspicious cases. Four of the day-schools are reported as recommending to parents that pupils be given the Schick test and in two of the same schools the Dick test also.

Dental health is apparently given careful attention in the day-schools. As a rule,, the dental needs are determined from inspection at the school by the school physician or nurse or by visiting school medical inspectors, and treatment given at moderate charge by the school dentist or by clinics. The city assumes the cost when perents are unable to pay. A similar procedure holds for the care of the eyes of pupils. Cases of ear trouble are also dealt with in very much the same way.

Six of the day-schools state that the hearing of pupils is tested at entrance. Six others qualify the same state-

ment—that is, the hearing is tested, but "not scientifically"; in two the teachers test the hearing; in one, "with the voice"; and in one other, hearing is tested at entrance but "not with the audiometer." Moreover, at the time of the survey in only 1 school was hearing tested at regular intervals.

A majority of the day-schools, 8 of the 13, keep weight charts, used in most of them in connection with suggestions as to diet. When necessary, the matter of underweight and malnutrition is taken up with parents by the health care department of the school and remedial measures discussed. On the whole, however, the children in the schools visited seemed to be in excellent condition.

In almost all the day-schools, general sanitary conditions were reported as excellent. In the case of the two schools that had one or two flaws in that respect, new buildings were soon to be provided. In the main, sanitary precautions include cleanliness of the school building, and a program of health talks for the pupils. The teachers also aid with careful personal inspection of the children. All the day-schools, as units in city public school systems, are compelled to comply with city health regulations.

FOOD

The day-schools, of course, are not concerned with the problem of food supply as are the residential schools. However, as their pupils may be recruited from comparatively distant parts of the city, the lunch question is one that demands the attention of the school management.

An analysis of how this is dealt with indicates three general methods:

1. The school has nothing to do with the children's food, provides no facilities for lunch, and does not furnish milk.....2 schools.
2. The children bring their lunch and the school enables them to buy milk or cocoa at very small cost. (In one case the school supplies the drink free to those unable to pay).....3 schools.
3. A school cafeteria with kitchen, usually excellently managed, furnishes wholesome food at very low cost.....8 schools.

A few examples will suffice to show how the plan fol-

lowed in the third group of schools works. Thus, in one school the children eat lunch in a basement cafeteria where for 5 cents they can get soup, beans and one sandwich; milk, 4 cents; spaghetti, potatoes and gravy, cocoa, 4 cents; ice cream, 5 cents. The highest cost of anything is 5 cents. The children are supervised during the lunch hour. Also, under a similar arrangement in another school, the children may obtain a soup, a salad, milk, a vegetable dish, and dessert, with sometimes a meat course—all in generous portions and at very moderate charge. Here even the kindergarten children go to the cafeteria where their teachers help them get their food and show them how to pay the small sum asked. In another case, the food is prepared in kitchens that are a special feature of the city school system and carried in containers to the school where, for 7 cents, each child may obtain a lunch consisting of two slices of buttered bread, soup or cocoa or milk, and a vegetable or pudding or stewed fruit. In another school a lunch is served each day for 5 cents, and for 2 cents in still another, the menu in the latter case consisting of a glass of milk and a dish such as hot creamed cabbage or potatoes.

FIRE PROTECTION

Fire exits are provided in sufficient number in practically all the day-schools visited; this was doubtful in only one case. In 6 of the 13 schools, however, these exits are not distinctly marked, and in 1 of them they are not marked at all. Only 5 of the schools were equipped with water hose and none with chemical engines. All but one, though, keep extinguishers at hand for emergency. The water supply in all cases is that of the local city system, as is also the fire alarm connection. Fire drills are held once a week in 2 schools, twice a month in 6 schools, once a month in 4 schools, and in 1 other case "no record." These drills are as a rule carried out very efficiently, and in most cases, in 11 of the 13, are held without notice.

For none of the schools is there any question concern-

ing the adequacy of the measures for protection against fire. The buildings are either very easily emptied or are of fireproof construction. In one instance not only is the building itself fireproof, but it is built alongside a hill so that the children can step out to the ground from each floor.

SUMMARY

THE COMPOSITE DAY-SCHOOL

A picture of the typical day-school as a functioning unit may be obtained from an analysis of the data relative to such schools already given. It must be remembered, also, that this average school is not here intended as the model school. It is rather a composite of the practices in greatest vogue among the day-schools studied during the survey.

The past quarter of a century has witnessed a remarkable growth in this country on the part of the day-school for the deaf. In terms of enrollment it has steadily extended its scope, assuming a distinct place in the field formerly taken over almost entirely by the residential school.

Type.—The day-school is an integral part of a city public school system, with all the characteristics of a public school, namely, that it is free, non-denominational, and without restriction as to entrance. The typical day-school comes under the general management of a city board of education and is thus unhampered by political considerations. A principal is the chief officer in the school, receiving appointment through the board of education and holding office, after having given evidence of capability, for life, although responsibility to the city superintendent of schools is the rule. The principal is not concerned with the management of funds in connection with the school, nor with the appointment of members of the teaching staff, or other employees of the school, this power usually resting with the board of education.

The principal, also, without the aid of an assistant, includes supervision of school work among her duties.

Financial Support.—The typical day-school derives its support from public appropriation on an annual budget plan that includes the general city school system in which the day-school is a unit. The budget system also governs the handling of funds in which the day-school alone is concerned.

The public character of the day-school is emphasized by the fact that pupils are not required to pay for tuition regardless of ability to pay. Pay pupils from outside the bounds of the city may be accepted although the occasion very seldom occurs.

It was not possible to ascertain the per capita cost in the day-school with any degree of completeness; it may approximate $300. Further, owing largely to the fact that the fiscal aspects of the management of the day-school are left with the central authorities of the city, there was a similar lack of data on the matter of cost of upkeep of plant, salaries of academic teachers, school equipment, library equipment, comparative increase in total expenditures, and per capita cost over a ten-year period.

School Administration.—The teaching staff in the average day-school is governed directly by the principal in accordance with city rules and regulations, and the pupils through the teachers and officers. The school itself is not directly concerned with business matters; such details are attended to by the disbursing office of the central school authority. The principal and teachers keep in close touch with parents of pupils as an aid in the management of the pupils.

Legal Status.—A compulsory school law exists for the typical day-school, and public officials must notify the school authorities of children who should be enrolled in a school for the deaf.

Admission of Pupils.—Only children who are deaf or so hard of hearing that they cannot continue in the

ordinary public schools and who are of "teachable mentality" are accepted as pupils, usually at any age between 4 and 21. No legal limit is set to the length of schooling allowed, nor is there distinction as to race or color. No provision otherwise is made for the feeble-minded deaf.

Teaching Staff.—A high school and normal school course and some special training to teach the deaf are the general qualifications demanded of teachers in the average day-school. The school staff, also, is almost entirely composed of hearing women.

Salaries.—The average annual salary of the principal may be a minimum of $2,600 and reach a maximum of approximately $3,450. The average minimum for women teachers is approximately $1,440, and maximum $2,350, ten years being the average number of years of service necessary to reach the latter. Industrial men teachers obtain an average minimum of $1,925, and a maximum of $2,850 after nine years of service; women industrial teachers start at an average of $1,590 and after 9 years of work reach $2,640.

Because the teachers in the typical day-school are also members of a city school system, they thereby may become beneficiaries of a pension retirement plan.

School Curriculum.—The course of study, although not prescribed by law, is intended to cover the ordinary 8 years of elementary public school work. The course also includes preliminary work in manual training for younger children although there is no definite correlation between the manual and academic work. However, no actual trades teaching is undertaken in the average day-school. A systematic course in physical training, supplemented by regular training in hygiene, is modelled on the plan in use in other city public schools. Rhythm work is also a regular part of the curriculum.

The day-school course does not concern itself with special moral training, this being left to the religious dictates of the home.

For textbooks the day-school has available the list prepared for use in all the public schools and, in addition, choice of such special books to meet the needs of deaf children as it deems necessary. Especially for language work the principal reliance is upon books prepared by teachers of the deaf.

The average day-school does not provide special library facilities, although it does maintain contact with public libraries, borrowing sets of books for class use. The aim is to encourage use of the public library outside.

School Records.—The average length of school life, as indicated by the day-school records, appears to be between 9 and 10 years. Economic pressure is the usual cause of pupils' leaving school before graduation; lack of ability to keep up with the work is the next important cause. No record of the after-school life of former pupils is kept.

Methods of Instruction.—Since its start the average day-school has been decidedly oral, although no particular method is prescribed by law. Auricular methods are also followed when practical. No definite procedure has been evolved to determine with greater accuracy the measure of success in speech work. The present method is a dependence upon only general results.

All forms of manual language are tabooed, in accordance with the sentiment that such means of communication are inconsistent with good oral instruction. Writing is begun as soon as the child enters.

Extra Schoolroom Activities.—The day-school provides for instruction in games during free time of play, although very little playground apparatus is furnished. As a rule, also, in the day-school there is no club activity among the pupils, nor do the latter maintain a school paper. Dramatic entertainments are occasionally held, usually for special occasions. Motion-picture equipment is available for use, often for educational purposes.

Sports and athletics are not on an organized basis, and teams are not maintained by the pupils.

Trips are made to various points of educational interest, usually industrial plants, stores in the city, and historic landmarks.

Occupations of Graduates.—Printing seems to be the occupation most favored by the graduates of the typical day-school, with auto repairing, carpentry, dressmaking, farming, and millinery next in importance. Some sort of effort by school experts is made at proper advisement and placement of pupils. Little information as to earning power of graduates is available. As the pupils live in the same city, they occasionally visit the school after leaving it; this is the usual means of keeping in touch with them.

Relation with Home.—A parent-teacher association, with periodic meetings, serves to bring together the school and home. Parents are also encouraged to visit the school. Regular reports of the work of pupils are sent home. The pupils are advised to use speech when at home, and the feeling is that they do communicate with their parents mainly by speech.

School Policy.—The principal in consultation with the teachers attends to the grading of the pupils, usually at the regular promotion time. This grading is based on an average of all the subjects taken.

The size of classes is not always a matter of control; it may depend upon the board of education, upon the size of enrollment, schoolhouse facilities, or the number of teachers provided by the budget. Usually there are 8 pupils to a class.

The average day-school attempts to return children to schools for the hearing when possible. Pupils who show promise are also prepared for entrance to public high schools.

Teachers' meetings are the principal means by which the school promotes professional growth. The average day-school is itself unable to maintain a course of training for teachers. Efforts to make known to outsiders the

work the school is doing may take the form of public exhibitions and participation in community projects.

Location.—The typical day-school is centrally located and easily reached. Its urban location, however, subjects it to the disturbances of heavy business traffic so that it is not always possible to do ideal work.

School Plant.—The grounds are of very limited extent, with little opportunity for campus extension. Still, satisfactory playground space is provided, and on the whole the grounds are adequate for the needs of modern schoolroom work.

The average school, whether it is a separate unit in a building to itself or classes assigned to a public school for hearing children, is well housed in a modern well equipped structure. The schoolrooms are quite satisfactory as to size, window space, lighting, ventilation, seats, desks, and general equipment. A piano at least, provides for the rhythm work. Equipment for elementary shop work, cooking and sewing is also furnished. Gymnasium facilities, too, are available, although no particular effort is made to equip the playground with the necessary apparatus. In addition the provision for play indoors is not entirely satisfactory.

Medical Attention.—The average day-school has no equipment for medical care, but it does have the services of a physician and a trained nurse on regular salary schedule. The children are given a physical examination at the time of entrance and again at periodic intervals. Vaccination against smallpox is also required. Careful attention is given to condition of teeth and eyes, and remedial measures prescribed, the city assuming the cost when parents are unable to do so.

The hearing is tested when pupils enter but this follows no standard method. Weight charts are kept as an aid for suggestions on physical improvement.

General sanitary conditions are very good and the children seem to be in an excellent state of health.

Food.—The main interest of the day-school in the diet of its pupils is in the management of a cafeteria for lunch purposes. This is an excellent arrangement whereby wholesome food and good service are provided at very moderate cost to the pupils.

Fire Protection.—Precautions for safety against fire—in the number of fire exits, extinguishers, water supply and fire alarm connections, fire drills, and type and construction of building—are quite satisfactory.

Conclusion.—The data given above present the details of a study of the conduct and management of day-schools for the deaf in the United States. It is hoped that they furnish suggestions as to the comparative efficiency of such schools.

I. S. F.

(To be concluded.)

SCHOOL ITEMS

Chicago Day-Schools.—Two new centers were opened in September, 1927. These are prevocational classes for deaf boys and girls over fourteen years of age who desire a greater variety of shop experience and more time spent in the shops than the elementary schools offer. Eighteen deaf boys and seven deaf girls from the Parker Practice Day-School, together with two teachers from the same school, were the original entrants in these classes which are located in the Tilden High Prevocational School for Boys and in the Lucy Flower High Prevocational School for Girls. An academic teacher of the deaf accompanies each group to the industrial classes to assist in the teaching of shop language.

Five pupils from the Parker Practice Day-School entered Parker Junior High School in September and are doing well. There are fourteen of the former pupils of the deaf-oral department now in the Parker Junior High School. They have a lip-reading lesson daily with a teacher in the deaf-oral department and attend all other classes with hearing pupils. Two deaf pupils graduated from Parker Junior High School last June and entered Parker Senior High School in the fall. Three deaf pupils also graduated from the senior high school in June, and one of them won the scholarship to Armour Institute of Technology.

New York Institution.—Mr. Edwin A. Hodgson has become a beneficiary of the State Retirement Annuity Fund, after serving the institution as instructor in printing for more than 51 years. Although relinquishing his duties as instructor, Mr. Hodgson still retains his connection with the institution and will continue as editor of the *Deaf-Mutes' Journal.*

Philadelphia Home for the Training in Speech.—An appropriation by the last legislature has made possible the completion of plans for the remodeling of the two

sleeping nurseries in Cottage No. 1. Housemothers will have attractive rooms, and up-to-date wash rooms and lavatories will be installed, as well as individual lockers for the children, and a large clothes storage closet.

A new fire escape has been added, and buildings are to be equipped with standpipe and hose. A new fire alarm system is also under consideration.

All schoolrooms, main halls and stairways, two playrooms and teachers' rooms have been redecorated. Five entire ceilings and floors have been replaced.

An audiophone was added to the equipment of the school in the hope of aiding in the development of speech work.

St. Rita School.—This school has been officially recognized by the department of education of the state of Ohio as a high school of the first grade. Last June the high school department graduated its first class of five members.

West Virginia School.—The new Industrial Arts Building has been completed and is now in use. A Style-B Kelly automatic cylinder press, with automatic feeder and jogger delivery, an additional linotype, Model 5, have been installed. The school now has 3 linotypes, 2 of the Model 5 and 1 Model 14. Preparations are being made to start photo-engraving.

During the last summer vacation the old shop building was remodeled with a view to converting it into a boys' dormitory. This work will not be completed for some time. New boilers were also installed in the power house, and improvements made in the cannery.

MISCELLANEOUS

Relation Between Physical Condition and Hearing.—Recent Associated Press reports reveal interesting facts concerning various experiments with the sense of hearing. The results obtained are best described in the following report which appeared in the *Washington Post*, January 1, 1928.

Experiments completed by the Boston University School of Medicine and the Evans Memorial Institute disclose that well-conditioned athletes have better hearing, in general, than any other class of persons tested. Positive correlation between physical fitness and acuteness of hearing was found by the experts.

Among those examined were groups of individuals whose daily work might be expected to develop especially keen ears, such as telephone operators, telegraphers and radio operators. Although many of these had unusual aptitudes, in general excellence of hearing they were surpassed by the athletes.

Persons below the best physical condition showed inferior hearing ability with a regularity equal to that with which highly fit persons showed superior ability. This was noted first in the comparisons between athletes and other groups, and was later confirmed in experiments with children from an outdoor school, a public school, a school for the blind and a state school for crippled children. The tests showed that the outdoor youngsters had the sharpest hearing, while the little cripples had the least acute ears of the juveniles studied.

The scientists point out that the results of the tests would be modified in cases where an actual impairment of the hearing organs existed, either as the result of specific diseased conditions or of injury. They assert that the experiments should not be interpreted as meaning that deafness is always, or even frequently, the result of impaired health. On the other hand, the experiments did indicate, it is explained, that a run-down condition does have a definite tendency to reduce hearing ability somewhat from the normal.

The same report goes on to explain some of the possibilities in special aptitudes in hearing ability.

Many of the special aptitudes disclosed were amazing to the physicians. One telegrapher, with his right ear to the instrument, could listen to a message coming over the wire, decode and type it, using both hands, and at the same time, with a telephone receiver held to the left ear by a support, he could carry on a conversation over the ordinary telephone circuit.

In this case a special associative process had been developed between stimuli to the nerves of the right ear and motor impulses to the arms and hands, as well as a corresponding association between stimuli to the left ear and motor impulses to the vocal organs.

A radio operator had the ability to listen to two messages on the same wave length received with similar intensity, one sent in Morse

code and the other in international dots and dashes. He could distinguish each from the other, and could decode and copy either at will. This man had developed the ability to ignore interfering signals to such a high degree that for him they virtually did not exist.

A Junior College for the Deaf.—A novel suggestion—novel in that no one had previously proposed it publicly—is that contained in a statement by Dr. J. W. Jones, superintendent of the Ohio School, relative to the possibility of establishing a junior college for the deaf. The junior college movement has become an accepted force in the general educational scheme, and Dr. Jones' proposal that a similar plan be adapted for the benefit of the deaf is a logical one. We trust the idea will not evaporate in discussion or be assigned to an impotent committee. It should crystallize into action.

The project, as it appeared in the *Ohio Chronicle* for December 31, 1927, was outlined as follows:

In a very able address before the Teachers' Association, Dr. E. E. Lewis of the Ohio State University set up the necessity of a junior college.

That is a college corresponding to college work, as a junior high school corresponds to a high school.

From the discussion, it appears that the large universities and colleges are being overrun with students who are not prepared to do college work. They are a hindrance to these schools of higher learning, rather than a help.

Many of these larger schools have set the time for excluding every student who is not prepared to enter upon and carry forward real college work.

To take care of this class of students between the high school and the college, a secondary or junior college must be established and at public expense.

His reasoning on this important subject was very clear and appeared sensible to us.

As we sat under his voice and could visualize the situation, we turned also in our mind to the deaf. Our own college at Washington, has been saying for years that many students enter not prepared for college work. The schools no doubt have done the best they could, but have been unable to prepare children to do the work of matured men and women.

These children do not feel responsibility and hardly know what it is all about.

As we suggested in the *Chronicle* a few weeks ago, would it not be a good thing for the schools to unite in asking the Government

to establish a junior college after the fashion of the proposed junior college for hearing students?

This junior college for the deaf could keep two things in mind—vocational, industrial and technical training on the one hand and English, literature and simple mathematics on the other.

It could be founded in some central part of the United States, preferably in a school under the Department of Education. The reason for that is that the Department of Education in a great many states is doing rehabilitation work at a heavy cost and that many of the deaf are given advantage of it.

The state of Iowa would be a good place to locate such a school, where the advantages of a large city are closer to a school.

Ohio would be an excellent place to found such a school because of its central location and the numerous large cities in the state.

We speak of this without any ambition of our own, because it could not hope to materialize before we have laid down the tools of service.

A course of study of perhaps two years could be provided for. After graduation from such a junior college, the pupils could pass into Gallaudet, better prepared to carry on the high branches of study according to the notion of Dr. Hall, the able president.

This proposal comes in all seriousness from one who is interested in the deaf and feels that they are entitled to an equal chance with hearing people in every line of education and vocational training.

The suggestions as to locations are suggestions only and should have no bearing on the general proposition of the necessity of a junior college for the deaf.

WHAT SAY YOU SUPERINTENDENTS?

The Normal Course at the Institution for Improved Instruction.—The following letter from Dr. Harris Taylor, superintendent of the Institution for the Improved Instruction of Deaf-Mutes, New York City, gives information concerning the course of teacher training offered by that school.

To complete the course of normal training requires a school year of forty weeks. The training class is conducted in order to supply this school and other schools for the deaf with trained teachers.

The minimum requirements for entrance to the class of teachers in training are:

1. The applicant must be a graduate of a reputable high school.

2. The applicant must have in addition at least two years of higher training. (Two years of successful teaching experience may be substituted for the second year of such training.)

Applicants must take an examination approximately the same as for the eighth grade of the public schools of the State of New York. This examination is given to all, regardless of their previous training or education; but applicants are judged more by their

ability to use the English language, and by their exercise of common sense as exhibited in this examination, than by detailed knowledge of specific subjects.

The tuition fee at present is $150, payable in three equal instalments: (1) on entrance in September, (2) on the first of January, and (3) on the first of June. This fee is in full for tuition, board, lodging and practically all laundry work. It also includes a large part of the necessary expense for stationery and textbooks.

The routine activities of the normal class are as follows: (1) observation of schoolroom work, (2) teaching under direction, (3) recitations, (4) lectures, (5) study of textbooks, and (6) required reading. All are expected to do a certain amount of substitute teaching as a part of their training.

Persons who are interested in the deaf can spend a very profitable year in this manner at a very slight expense. No one completing the course has ever gone without a position.

It is very important that applicants for admission to this class should be possessed of normal hearing and that they should have no radical speech defects. No one can be received as a member of this class who is known to be in bad health at the time of application.

A person interested in this training course should give the following information in regard to herself: age, education, experience in teaching (if any), and church affiliation. She should give the name of a teacher, who is familiar with her character and ability, also the name of a minister with whom she is acquainted.

Applicants should make prompt reply to this circular letter, and if their replies are satisfactory, the matter of examination, etc., will be taken up at an early date.

HARRIS TAYLOR, Principal.

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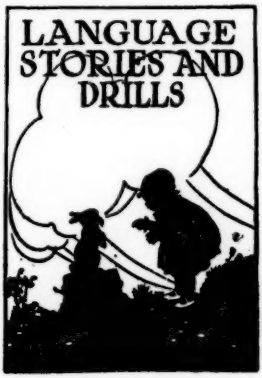

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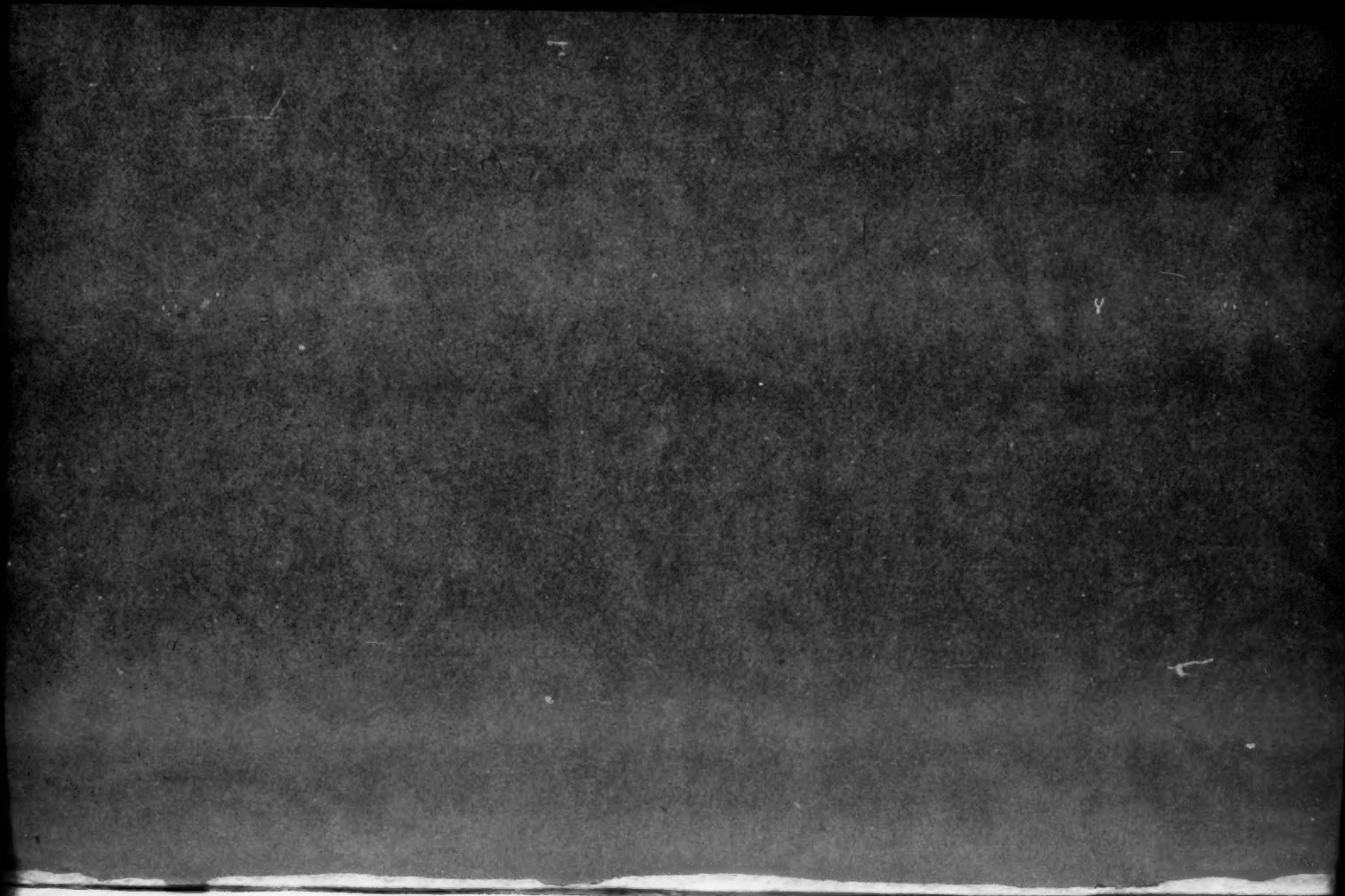

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